WO 00/50639

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	maltase glucoamylase/alpha- glucosidase/MGAM	154360	NM_00466 8	Chr.7
:	lactase-phlorizin hydrolase/LPH/lactase/LCT	603202	NM_00229 9	2q21
Jycosidases	salivary amylase A/AMY1A	104700	NM_00403 8	1p21
	salivary amylase B/AMY1B	104701	***	1p21
	salivary amylase C/AMY1C	104702	****	1p22
	pancreatic amylase A/AMY2A	104650	X07057	1p21
	pancreatic amylase B/AMY2B	104660	*****	1p21
	dipeptidylpeptidase IV/CD26/ADA complexing protein 2/DPP4	102720	NM_00193 5	2q23
	pepsinogen A/PGA/PG	169700	AH001519	11q13
	pepsinogen, group 3/PGA3	169710	***	11413
	pepsinogen C/PGC	169740	J04443	6p21.3- p21.1
	kallikrein 1/KLK1	147910	AH002853	19q13.2- q13.4
	chymotrypsin-like protease	118888	X71875	16q22.1
	trypsinogen 1/TRY1/protease, serine 1/PRSS1	276000	NM_00276 9	7435
	trypsinogen 1/TRY2/protease, serine 2/PRSS2	601564	NM_00277 0	7q35
	trypsinogen 1/TRY3/protease, serine 3/PRSS3	****	NM_00277 1	****
Despession	enterokinase 1/TRY3/protease, serine7/PRSS7	226200	NM_00277	21q21

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	and Peptidases	chymotrypsinogen 1/CTRB1	118890	NM_00190 6	16q23.2- q23.3
Gastrointesti nal Drug		carboxypeptidase A1/CPA1	114850	NM_00186 8	7
Metabolism		carboxypeptidase A2/CPA2	889009	NM_00186	* * * *
		carboxypeptidase Z/CPZ	603105	NM_00365 2	
		elastase 1/ELA1	130120	D00158	12q13
		renal microsomal dipeptidase/DPEP1 (b-lactam ring hydrolysis)	179780	179780 NM_00441	16q24.3
		tripeptidyl peptidase II/TPP2	190470	190470 NM_00329	13q32-q33
		protease inhibitor 1/alpha-1- antitrypsin/AAT/PI	107400	107400 NM_00029	14q32.1
		protease inhibitor/alpha-1- antichymotrypsin/AACT	107280	NM_00108 5	14q32.1
		protease inhibitor 1 (alpha-1- antitrypsin)-like/PIL	107410	107410 NM_00622 0	14q32.1
		Carboxyl ester lipase (bile salt- stimulated lipase)/CEL	114840	M85201	9q34.3
		Carboxyl ester lipase-like (bile saltstimulated lipase-like)/CELL	114841	NM_00180 8	9q34.3
	Lipases	Pancreatic colipase/CLPS	120105	M95529	6pter-p21.1
		Pancreatic triglyceride lipase/PNLIP	246600	246600 AH003527	10q26.1
		Lipoprotein lipase/LPL	238600	NM_00023	8p22
		Hepatic triglyceride lipase/LIPC	151670	151670 AH005429	

		salivary peroxidase/SAPX	170990	1139573	****
	Oxidases	alcohol dehydrogenases 6/ADH6	103735	NM_00067	15q26
	Esterases	paraoxonase 2/PON2	602447	L48513	7q21.3
	Phoenhatae	intestinal alkaline phosphatase/ALPI	171740	171740 NM_00163	
	S	tissue non-specific alkaline phosphatase/liver alkaline phosphatase/ALPL	171760	171760 NM_00047	1p
		serum albumin/ALB	103600	NM_00047	4q11-q13
		alpha fetoprotein/AFP	104150	104150 NM_00113	4q11-q13
	-	alpha albumin/afamin/AFM/ALB2	104145	NM_00113	4911-913
		vitamin D-binding protein/group- specific component/GC	139200	AH004448	4q12
	Rload	orosomucoid 1/alpha 1 acid glycoprotein/ORM1	138600	M13692	9q34.1- q34.3
	Transport	orosomucoid 2/alpha 1 acid glycoprotein, type 2/ORM2	138610	NM_00060 8	9q34.1- q34.3
		transthyretin (prealbumin, amyloidosis type I)/TTR	176300	NM_00037	18q11.2- q12.1
		thyroxin-binding globulin/TBG	314200	NM_00035 4	Xq22.2
Drug. Binding		corticosteroid binding globulin precursor/CBG	122500	NM_00175 6	14q32.1
	7,	sex hormone-binding globulin/SHBG	182205	X16349	17p13-p12

	mannose-binding lectin, soluble/MBL2	154545	NM_00024	10q11.2- q21
	Hepatic fatty acid binding protein/FABP1	134650	***	2p11
	Intestinal fatty acid binding protein/FABP2	134640	NM_00013 4	4q28-q31
Bile Acid	Muscle fatty acid binding protein/mammary-derived growth inhibitor/MDGI/FABP3	134651	NM_00410 2	1p33-p31
Binders	Adipocyte fatty acid binding protein/FABP4	600434	NM_00144 2	8q21
	Ileal fatty acid binding protein/FABP6 600422	600422	019869	5q23-q35
	Diain Tatty acid Omoning	602965	D88648	6q22-q23
	Adipocyte long chain fatty acid transport protein/FATP	600691	***	***
	Retina-specific ATP binding cassette transporter/ABCR	601691	NM_00035	1p21-p13
	ATP binding cassette 1/ABC1	600046	AJ012376	9q22-q31
	ATP binding cassette 2/ABC2	600047	U18235	9q34
	ATP binding cassette 3/ABC3	601615	00108 9	16p13.3
	ATP binding cassette 7/ABC7	300135	AB005289	Xq13.1- q13.3
	ATP binding cassette 8/ABC8	603076	AF038175	21q22.3
	ATP-binding cassette 50/ABC50	603429	AF027302	6p21.33
	Placenta-specific ATP-binding cassette transporter/ABCP	603756	603756 NM_00482	4922

7q31.2	Xq28	12q11-q12	11p15.1	1p22-p21	14q24.3	6p21.3	6p21.3	16p13.1	10q24	**	***	* * * *	****
NM_00049	NM_00003	U28150	NM_00035 2	NM_00285 8	NM_00505 0	NM_00059	NM_00054	L05628	NM_00039	NM_00378 6	NM_00584 5	NM_00568 8	NM_00569
602421	300100	601081	6002009	170995	603214	170260	170261	158343	601107	* * * *	* * * * *	* * * *	601439
cystic fibrosis transmembrane conductance regulator/CFTR	adrenoleukodystrophy/adrenomyelone uropathy/ALD	adrenoleukodystrophy related protein/ALDR	sulfonylurea receptor (hyperinsulinemia)/SUR	peroxisomal membrane protein 1/PXMP1	peroxisomal membrane protein 1-like/PXMP1L	BC antigen peptide transporter 1/MHC porters 1/TAP1	antigen peptide transporter 2/MHC 2/TAP2	multidrug resistance associated protein MRP1	multidrug resistance associated protein MRP2/CMOAT	ATP-binding cassette, sub-family C (CFTR/MRP), member 3/CMOAT2	ATP-binding cassette, sub-family C (CFTR/MRP), member 4/MOATB	ATP-binding cassette, sub-family C (CFTR/MRP), member 5/SMRP	ATP-binding cassette, sub-family C (CFTR/MRP), member 9/SUR2

Absorption and Distribution

multidrug resistance protein MDR1	171050	X96395	7q21.1
multidrug resistance protein MDR3/P-glycoprotein 3/PGY3	602347	X06181	7q21.1
anthracylcline resistance-related protein/ARA	603234	NM_00117 1	16p13.1
bile salt export pump/BSEP	603201	NM_00374	2q24
familial intrahepatic cholestasis	602397	NM_00560 3	18q21
Human sorcin/SRI	182520	L12387	7q21.1
Solute carrier family 1, member 1/SLC1A1 (glutamate)	133550	08680U	9p24
Solute carrier family 1, member 2/SLC1A2 (glutamate)	600300	U03505	11p13-p12
Solute carrier family 1, member 3/SLC1A3 (glutamate)	600111	U03504	5p13
Solute carrier family 1, member 4/SLC1A4 (glutamate)	600229	NM_00303 8	2p15-p13
Solute carrier family 1, member 5/SLC1A5 (neutral AA)	109190	AF105230	19q13.3
Solute carrier family 1, member 6/SLC1A6 (glutamate)	600637	NM_00507 1	***
Solute carrier family 2, member 1/SLC2A1/SGLT1 (glucose)	182380	NM_00651 6	22q13.1
Solute carrier family 2, member 2/SLC2A2/GLUT2 (glucose)	138160	NM_00651 6	3q26.1- q26.3
Solute carrier family 2, member 3/SLC2A3/GLUT3 (glucose)	138170	M20681	12p13.3

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Solute carrier family 2, member 4/SLC2A4/GLUT4 (glucose)	138190	*	17p13
Solute carrier family 2, member 5/SLC2A5/GLUT5 (glucose)	138230	NM_00303	1p36.2
Solute carrier family 3 member 1/SLC3A1 (aa transporter)	104614	* * *	2p16.3
Solute carrier family 5 member 1/SLC5A2 (glucose)	182381	**	16p11.2
Solute carrier family 5 member 3/SLC5A3 (myoinositol)	600444	L38500	21q22
Solute carrier family 5 member 6/SLC5A6 (folate, biotin, lipoate)	604024	**	2p23
Solute carrier family 6 member 1/SLC6A1 (GABA)	137165	X54673	3p25-p24
Solute carrier family 6 member 2/SLC6A2 (noradrenalin)	163970	NM_00104	16q12.2
Solute carrier family 6 member 3/SLC6A3 (dopamine)	126455	L24178	5p15.3
Solute carrier family 6 member 4/SLC6A4 (serotonin)	182138	X70697	17q11.1- q12
Solute carrier family 6, member 5/SLC6A5 (glycine)	604159	NM_00421 1	* * *
Solute carrier family 6, member 6/SLC6A6 (taurine)	186854	U16120	3p25-q24
Solute carrier family 6, member 8/SLC6A8 (creatine)	300036	NM_00562 9	300036
Solute carrier family 6, member 9/SLC6A9 (glycine)	601019	S70612	1p33

	Solute carrier family 6, member 10/SLC6A10 (creatine-testis)	601294	**	16p11.2
	Solute carrier family 6, member 12/SLC6A12 (GABA-betaine)	603080	NM_00304 4	12p13
	Solute carrier family 7, member 1/SLC7A1 (cationic AA)	104615	**	13q12.3
	Solute carrier family 7, member 2/SLC7A2 (cationic AA)	601872	D29990	8p22
	Solute carrier family 7, member 4/SLC7A4 (cationic AA)	603752	***	22q11.2
	Solute carrier family 7, member 5/SLC7A5 (neutral AA)	600182	M80244	16q24.3
	Solute carrier family 7, member 7/SLC7A7 (dibasic AA)	663209	Y18474	14q11.2
	Solute carrier family 7, member 9/SLC7A9 (neutral AA)	604144	****	19913.1
	Solute carrier family 10, member 1/SLC10A1 (taurocholate)	182396	NM_00304	chr. 14
	Solute carrier family 10, member 2/SLC10A2 (taurocholate)	601295	NM_00045 2	13q33
-	Solute carrier family 11, member 1/SLC11A1 (?)	600266	AH002806	2q35
Solute	Solute carrier family 11, member 2/SLC11A2 (iron)	600523	L37347	12q13
Antiporters	Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)	604148	NM_00398 4	17p11.1- q11.1
	Solute carrier family 14, member 1/SLC14A1 (urea)	111000	***	18q11-q12

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Solute carrier family 14, member 2/SLC14A2 (urea)	601611	69696X	18q12.1- q21.1	
Solute carrier family 15, member 1/SLC15A1 (peptides)	600544	U13173	13q33-q34	
Solute carrier family 15, member 2/SLC15A2 (peptides)	602339	S78203	* * * *	
Solute carrier family 16, member 1/SLC16A1 (monocarboxylic acids)	600682	NM_00305 1	1p13.2-p12	
Solute carrier family 16, member 2/SLC16A2 (monocarboxylic acids)	300095	NM_00651	Xq13.2	
Solute carrier family 16, member 3/SLC16A3 (monocarboxylic acids)	603877	NM_00420	* * * * *	
Solute carrier family:16, member 4/SLC16A4 (monocarboxylic acids)	603878	***	***	
Solute carrier family 16, member 5/SLC16A5 (monocarboxylic acids)	603879	NM_00469 5	**	
Solute carrier family 16, member 6/SLC16A6 (monocarboxylic acids)	603880	NM_00469	**	
Solute carrier family 16, member 7/SLC16A7 (monocarboxylic acids)	603654	AF049608	12q13	
Solute carrier family 18, member 1/VAT1/SLC18A1 (monoamines)	193001	L09118	10q25	
Solute carrier family 18, member 2/VAT2/SLC18A2 (monoamines)	193002	* * * *	8p21.3	
Solute carrier family 18, member 3/VAT3/SLC18A3 (monoannines)	988009	NM_00305 5	10q11.2	
Solute carrier family 19, member 1/SLC19A1 (reduced folate)	600424	U19720	21q22.3	
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Solute carrier family 19, member 2/SLC19A2 (thiamine)	603941	AF160186	1q23.2- q23.3
Solute carrier family 21, member 2/SLC21A2 (prostaglandin)	601460	NM_00563 0	3q21
Solute carrier family 21, member 3/SLC21A3 (organic anion)	602883	NM_00507 5	12p12
Solute carrier family 22, member 1/SLC22A1 (organic cation)	602607	NM_00305 8	6q26
Solute carrier family 22, member 1-like/SLC22A1L (organic cation)	602631	602631 AF037064	11p15.5
Solute carrier family 22, member 2/SLC22A2 (organic cation)	602608	NM_00305 8	6q26
Solute carrier family 22, member 4/SLC22A4 (organic cation)	604190	NM_00305 9	Chr. 5
Solute carrier family 22, member 5/SLC22A5 (carnitine)	603377	0 0 0	5q33.1
Solute carrier family 25, member 1/SLC25A1 (tricarboxylic acids) (mitochondrial)	190315	X96924	22q11
Solute carrier family 25, member 11/SLC25A11 (oxoglutarate/malate) (mitochondrial)	604165	NM_00356	17p13.3
Solute carrier family 25, member 12/SLC25A12 (?) (mitochondrial)	603667	NM_00370 5	**
Solute carrier family 25, member 13/SLC25A13 (?) (mitochondrial)	603859	* * * *	7q21.3
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Solute carrier family 25, member 15/SLC25A15 (omithine) (mitochondrial)	603861	* * * *	13q14
Solute carrier family 25, member 16/SLC25A16 (ADP/ATP) (mitochondrial)	139080	M31659	10q21.3- q22.1
Solute carrier family 29, member 1/SLC29A1/ENT1 (nucleoside) (mitochondrial)	602193	NM_00495 5	6p21.2- p21.1
Solute carrier family 29, member 2/SLC29A2/ENT2 (nucleoside) (mitochondrial)	602110	X86681	11913
Aryl hydrocarbon receptor nuclear translocator/ARNT	126110	NM_00166 8	1921
Aryl hydrocarbon receptor nuclear translocator-like/ARNTL	602550	NM_00117 8	11p15
Aryl hydrocarbon receptor/AHR	600253	NM_00162 1	7p15
Nuclear receptor subfamily 1, group I, member 2/NR112	603065	NM_00388 9	* * *
Constitutive androstane receptor, beta/orphan nuclear hormone receptor/CAR	603881	NM_00512	**
Nuclear receptor subfamily 1, group H, member 2/NR1H2	600380	U07132	19q13.3
Retinoic acid receptor, alpha/RARA		NM_00096 4	17q12
 Retinoic acid receptor, beta/RARB	180220	180220 NM_00096	3p24

Actually acid receptor, gammara acid	180190	M57707	12q13
Retinoid X receptor alpha/RXRA	180245	NM_00569	9q34.3
Retinoid X receptor beta/RXRB	180246	X66424	6p21.3
Retinoid X receptor gamma/RXRG	180247	U38480	1q22-q23
RAR-related orphan receptor A/RORA	600825	NM_00294 3	15q21-q22
RAR-related orphan receptor B/RORB	600825	****	15q21-q22
	602943	0 00500 0	1921
cellular retinoic acid-binding protein, type 2/CRABP2	180231	****	1q21.3
glucocorticoid receptor/GRL	138040	NM_00017 6	5q31
Peroxisome proliferative activated receptor, alpha/PPARA	170998	NM_00503 6	22q12- q13.1
Peroxisome proliferative activated receptor, gamma/PPARG	601487	NM_00503 7	3p25
Peroxisome proliferative activated receptor, delta/PPARD	6E+05	NM_00623 8	1921.3
cytochrome P450, subfamily I, polypeptide 1 (aryl hydrocarbon oxidase)/CYP1A1	108330	NM_00049	15q22-q24
cytochrome P450, subfamily I, polypeptide 2 (phenacetin metabolism)/CYP1A2	124060	AH002667	15q22-qter
cytochrome P450, subfamily IB, polypeptide 1 (dioxin inducible)/CYP1B1	601771	601771 NM_00010	2p22-p21

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cytochrome P450, subfamily II, polypeptide I (phenobarbital inducible)/CYP2A cytochrome P450, subfamily IIA, polypeptide 6 (coumarin-7- hydroxylases)/CYP2A6 cytochrome P450, subfamily IIB (phenobarbital inducible)/CYP2B (201129) cytochrome P450, subfamily IIC, polypeptide 8/CYP2C8 cytochrome P450, subfamily IIC, polypeptide 8/CYP2C8 cytochrome P450, subfamily IIC, polypeptide 9 (hydroxylation of follusmide)/CYP2C9 cytochrome P450, subfamily IIC, polypeptide 18/CYP2C18 cytochrome P450, subfamily IIC, polypeptide 18/CYP2C18 cytochrome P450, subfamily IIC, polypeptide 19 (mephenytoin 4- and hydroxylation)/CYP2D6 cytochrome P450, subfamily IIIC, polypeptide 6 (debrisoquine A150, subfamily IIIC, polypeptide 6 (debrisoquine Cytochrome P450, subfamily IIIC, polypeptide 1/CYP2E1 cytochrome P450, subfamily IIIC, polypeptide 2/CYP2E1 cytochrome P450, subfamily IIIC, polypeptide 3/CYP2E1 cytochrome P450, subfamily IIC, polypeptide 3/CYP2E1 cytochrome P450, subfamily IIC, polypeptide 3/CYP2E1 cytochrome P450, subfami	19q13.2	19q13.2	19q13.2	10q24	10q24	10q25	10q24.1- q24.3	22q13.1	10q24.3- qter	19q13.2	1p31.3- p31.2	Pac
cytochrome P450, subfamily II, polypeptide I (phenobarbital inducible)/CYP2A cytochrome P450, subfamily IIA, polypeptide 6 (coumarin-7- hydroxylase)/CYP2A6 cytochrome P450, subfamily IIB polypeptide 8/CYP2C8 cytochrome P450, subfamily IIC, polypeptide 8/CYP2C8 cytochrome P450, subfamily IIC, polypeptide 9 (hydroxylation of fool131 cytochrome P450, subfamily IIC, polypeptide 9 (hydroxylation of fool131 cytochrome P450, subfamily IIC, polypeptide 18/CYP2C18 cytochrome P450, subfamily IIC, polypeptide 19 (mephenytoin 4- hydroxylase)/CYP2C19 cytochrome P450, subfamily IID, polypeptide 6 (debrisoquine foolypeptide 6 (debrisoquine foolypeptide 6 (debrisoquine foolypeptide 1/CYP2DE foolypeptide 1/CYP2DE cytochrome P450, subfamily IIF cytochrome P450, subfamily IIIF cytochrome P450, subfamily IIIF cytochrome P450, subfamily IIIF cytochrome P450, subfamily IIIF cytochrome P450, subfamily III cyt									<u> </u>			
cytochrome P450, subfamily II, polypeptide I (phenobarbital inducible)/CYP2A cytochrome P450, subfamily IIA, polypeptide 6 (coumarin-7- liydroxylase)/CYP2A6 cytochrome P450, subfamily IIB (phenobarbital inducible)/CYP2B cytochrome P450, subfamily IIC, polypeptide 8/CYP2C8 cytochrome P450, subfamily IIC, polypeptide 9 (hydroxylation of tolbutamide)/CYP2C9 cytochrome P450, subfamily IIC, polypeptide 18/CYP2C18 cytochrome P450, subfamily IIC, polypeptide 19 (mephenytoin 4- hydroxylation)/CYP2C19 cytochrome P450, subfamily IIB hydroxylation)/CYP2D6 cytochrome P450, subfamily III		0 NM_0				<u> </u>						
	12396	12272	12393	60112	601130	60113	124020	12403(124040	124070	601258	
	cytochrome P450, subfamily II, polypeptide 1 (phenobarbital inducible)/CYP2A	cytochrome P450, subfamily IIA, polypeptide 6 (coumarin-7-hydroxylase)/CYP2A6	cytochrome P450, subfamily IIB (phenobarbital inducible)/CYP2B	cytochrome P450, subfamily IIC, polypeptide 8/CYP2C8	cytochrome P450, subfamily IIC, polypeptide 9 (hydroxylation of tolbutamide)/CYP2C9	cytochrome P450, subfamily IIC, polypeptide 18/CYP2C18			cytochrome P450, subfamily IIE (ethanol inducible)/CYP2E	cytochrome P450, subfamily IIF (ethoxycoumarin monooxygenase), polypeptide 1/CYP2F1	cytochrome P450, subfamily IIJ (arachidonate epoxygenase), polypeptide 2/CYP2J2	4czf01_xls
	·						Cytochrome P450s					

cytochrome P450, subfamily IIIA (niphedipine oxidase), polypeptide 3/CYP3A4	124010	124010 NM_00077	7q22.1
cytochrome P450, subfamily IVA (fatty acid W-hydroxylase), polypeptide 11/CYP4A11	601310	NM_00077	Chr.1
cytochrome P450, subfamily IVB, polypeptide 1/CYP4B1	124075	77000_MN 9	1p34-p12
cytochrome P450, subfamily IVF (leukotriene B4-W-hydroxylase), polypeptide 3/CYP4F3	601270	NM_00089 6	19p13.2
cytochrome P450, subfamily VIIA (cholesterol 7-a-hydroxylase), polypeptide 1/CYP7A1	118455	M89803	8q11-q12
cytochrome P450, subfamily VIIB (oxysterol 7-a-hydroxylase), polypeptide 1/CYP7B1	603711	AF029403	8q21.3
cytochrome P450, subfamily VIIIB (sterol 12-a-hydroxylase), polypeptide 1/CYP8B1	602172	* * * * *	3p21.3-p22
cytochrome P450, subfamily XIA (cholesterol side-chain cleavage)/CYP11A	118485	NM_00078	15q23-q24
cytochrome P450, subfamily XIB, polypeptide 2 (steroid 11-b-hydroxylase)/CYP11B2	124080	124080 NM_00049	8q21
cytochrome P450, subfamily XIX (androgen aromatase)/CYP19	107910	107910 NM_00010	15q21.1
cytochrome P450, subfamily XXI (sterol 21-a-hydroxylase)/CYP21	201910	M13936	6p21.3

		cytochrome P450, subfamily XXIV (25-hydroxyvitamin D 24-hydroxylase)/CYP24	600125	S67623	20q13.2- q13.3
		cytochrome P450, subfamily XXVIA, polypeptide 1 (retinoic acid hydroxylase)/CYP26A1	602239	602239 NM_00078	10q23-q24
		cytochrome P450, subfamily XXVIIA, polypeptide 1 (25-hydroxyvitamin D-1-213700 a-hydroxylase)/CYP27A1	213700	NM_00010 5	2q33-qter
	***************************************	adrenodoxin/ferredoxin 1/FDX1/ADX 103260	103260	NM_00410 9	11922
		adrenodoxin reductase/ferredoxin:NADP(+) reductase/FDXR/ADXR	103270	103270 NM_00411	17q24-q25
		cytochrome P450, subfamily XXVIIB, polypeptide 1 (25-hydroxyvitamin D-1-264700 a-hydroxylase)/CYP27B1	264700	NM_00078	12q14
		cytochrome P450, subfamily XLVI (cholesterol 24-hydroxylase)/CYP46	604087	NM_00666	14q32.1
		cytochrome P450, subfamily LI (lanosterol 14-a-demethylase)/CYP51	601637	U51692	7q21.2- q21.3
	Cofactor	HOMOGEN TAKEN	603707	AJ224328	6p21.3
	Synthesis		603708	****	5q11
		alcohol dehydrogenases 1, alpha subunit/ADH1	103700	NM_00066	4922
Phase I Drug Metabolism		alcohol dehydrogenases 2, beta subunit/ADH2	103720	99000_MN 8	4q22
(oxidation and	Alcobol	alcohol dehydrogenases 3, gamma subunit/ADH3	103730	M12272	4q22

	Dehydrogen	Dehydrogen alcohol dehydrogenases 4/pi	103740	M15943	4022
		alcohol dehydrogenases 5/chi isozyme/ADH5	103710	NM_00067	4q21-q25
		alcohol dehydrogenases 6/ADH6	103735	NM_00067	15q26
		alcohol dehydrogenases 7/ADH7	600086	AH006682	4q23-q24
		aldehyde dehydrogenase 1/ALDH1 (liver cytosol)	100640	AH002598	9q21
		aldehyde dehydrogenase 2/ALDH2 (liver mitochondria)	100650	K03001	12q24.2
		3/acetaldehyde	100660	M74542	17p11.2
		aldenyde denydlogenase 5/acetaldehyde	100670	NM_00069	9p13
	Aldehyde	aldehyde de A1/succinic dehydrogen	271980	271980 NM_00108 0	6p22
	ases		600463	NM_00069 3	15926
		7/acetaldehyde	600466	NM_00069 4	11913
		aldehyde dehydrogenase 8/ALDH8	601917	NM_00069 5	chr. 11
		aldehyde dehydrogenase 9/g- aminobutyraldehyde dehydrogenase/ALDH9	602733	NM_00069 6	1922-923
-		aldehyde dehydrogenase 10/ALDH10	270200	NM_00038	17p11.2
		•	-	•	

	Aldo-keto reductase family 1, member			
	A1/dihydrodiol	103830	90900 WN	1p33-p32
	dehydrogenasc/AKR1A1		•	
	Aldo-keto reductase family 1, member		35 100 MM	
	C1/dihydrodiol	600449	14IN 00133	10p15-p14
	dehydrogenase/AKR1C1		า	•
	Aldo-keto reductase family 1, member		22000 3 414	
	C3/dihydrodiol	603966	NM_00373	10p15-p14
	dehydrogenase/AKR1C3		٧	•
	Aldo-keto reductase family 1, member	13000	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Aldo-Keto	C4/chlorodecone reductase/AKR1C4	000451	+ + + +	10p15-p14
Reductases	Aldo-keto reductase family 7, member		07000 744	
	A2/aflatoxin aldehyde	603418	NM_00368	***
	reductase/AKR7A2		5	
	Carbonyl reductase 1/CBR1	114830	NM_00175	21,222,12
	Carbonyl reductase 2/CBR2	****	****	chr. 11
	Carbonyl reductase 3/CBR3	803608	NM_00123 6	21q22.2
	Sepiapterin reductase (7,8-		2.000	
	dihydrobiopterin:NADP+	182125	182125 NM_00312	2p14-p12
	oxidoreductase)/SPR		4	•
	Z-crystallin/quinone reductase/CRYZ	123691	L31521	1p31-p22
•	Z-crystallin-like/quinone reductase-	603920	NM_00511	21022 1
Oninone	like/CRYZL1	00000	1	1.77417
Oxidoreduct	NAD(P)H menadione oxidoreductase		ATA DOODO	
ases		125860	125860 MM _ 00090	16q22.1
	inducible/NMOR1/diaphorase 4/DIA4		າ	•

		NIA DADATI			
		NAD(F) In menadione oxidoreductase 2, dioxin-inducible/NMOR2	160998	160998 NM_00090	6pter-q12
		Flavin-containing monooxygenase	136130	NM_00202 1	1923-925
		Flavin-containing monooxygenase 3/FMO3	136132	AH006707	1923-925
·		Flavin-containing monooxygenase 4/FMO4	136131	NM_00146 0	1423-425
		Flavin-containing monooxygenase 5/FMO5	603957	NM_00146 1	1421.1
Flavin-	Flavin-	Monoamine Oxidase A; MAOA	309850	M69226	Xp11.23
Dependent		Monoamine Oxidase B; MAOB	309860	M69177	Xp11.23
Oxidoreduct ases	Oxidoreduct ases	Xanthine dehydrogenase/XDH	278300	NM_00037 9	2p23-p22
		Aldehyde oxidase 1/AOX1	602841	NM_00115 9	2q33
		Copper-containing amine oxidase/AOC3	603735	NM_00373 4	17q21
		sulfite oxidase/SUOX	272300	272300 NM_00045	***
		Dihydropyrimidine dehydrogenase (5-fluorouracil detoxification)	274270	U09178	1p22
		Peroxisome proliferative activated receptor, alpha/PPARA	170998	170998 NM_00503	22q12- q13.1
	Peroxisome Proliferation	Peroxisome Peroxisome proliferative activated Proliferation receptor, gamma/PPARG	601487	NM_00503	3p25
		Peroxisome proliferative activated receptor, delta/PPARD	180231	NM_00623 8	1921.3
		peroxisome biogenesis factor 1/PEX1 602136	a	AB008112	7q21-q22

established in

	acyr-Coenzyme A oxidase I/ACOXI (peroxisomal)	264470	264470 NM_00403	17925
Ovidation	acyl-Coenzyme A oxidase 2, branched chain/ACOX2 (peroxisomal)		NM_00350	3p14.3
	acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain precursor/ACADS (mitochondrial)	201470	NM_00001	12q22-qter
	acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain/ACADM (mitochondrial)		201450 NM_00001 6	1p31
	acyl-Coenzyme A dehydrogenase, long chain/ACADL (mitochondrial)	201460	NM_00160 8	2q34-q35
	hydroxyacyl-Coenzyme A dehydrogenase, type IVHADH2	602057	NM_00449	****
	enoyl-Coenzyme A hydratase 1/ECH1 (peroxisomal)	969009	NM_00139 8	19413
Sulfate Unit Activation	3-prime-phosphoadenosine 5-prime- phosphösulfate synthase 1/PAPSS1	603262	NM_00544	49
	Phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1	171150	171150 NM_00105	16p12.1- p11.2
	Phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2	601292	NM_00105 4	16p12.1- p11.2
	Phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3	600641	L19956	16p11.2
	Sulfotransferase, family 1C, member 3/SULT1C1	602385	U66036	2q11.1- q11.2
	Dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1		NM_00316	19q13.3
•				

	Sulfotransferase, family 2B, member 1/SULT2B1	604125	NM_00460 5	19q13.3
	Estrogen-preferring sulfotransferase/STE	600043	NM_00542 0	4q13.1
	N-deacetylase/N-sulfotransferase (heparan glucosaminyl)/NDST1	600853	U18918	5q32-q33.3
	N-deacetylase/N-sulfotransferase (heparan glucosaminyl)/NDST2	603268	NM_00363 5	10q22
Sulfation	N-deacetylase/N-sulfotransferase (heparan glucosaminyl)/NDST3	603950	NM_00478 4	* * * *
	Carbohydrate sulfotransferase 1 (chondroitin 6/keratan)/CHST1	603797	NM_00365 4	11p11.2- p11.1
:	Carbohydrate sulfotransferase 2 (chondroitin 6/keratan)/CHST2	603798	****	7q31
	Carbohydrate sulfotransferase 3 (chondroitin 6/keratan)/CHST3	603799	NM_00427 3	**
	Cerebroside sulfotransferase (3'- phosphoadenylylsulfate:galactosylcera mide 3')/CST	602300	602300 NM_00486	* * *
	Heparan sulfate (glucosamine) 3-0-sulfotransferase 1/HS3ST1	603244	NM_00511 4	**
	Heparan sulfate (glucosamine) 3-0-sulfotransferase 2/HS3ST2	604056	NM_00604 3	16p12
	Heparan sulfate (glucosamine) 3-O-sulfotransferase 3A1/HS3ST3A1	604057	NM_00604 2	17p12- p11.2
	Heparan sulfate (glucosamine) 3-0-sulfotransferase 3B1/HS3ST3B1	604058	NM_00604 1	17p12- p11.2
	Heparan sulfate (glucosamine) 3-0-sulfotransferase 4/HS3ST4	604059	AF105378	16p11.2

Sulfhydrylati	Methylguanine methyltransferase (O6-Sulfhydrylati alkylguanine detoxification)	156569	M29971	10q26
uo	unósŭnate thiotransferase/rhodanese/TST	180370	D87292	22q11.2- qter
	UDP glycosyltransferase 1/UGT1	191740	NM_00107 2	Chr. 12
	UDP glycosyltransferase family 2, member B4/UGT2B4	600067	NM_00107 3	4q13
ş Ş	UDP glycosyltransferase family 2, member B7/UGT2B7	890009	NM_00107 4	1914
UDF- Glycosyltran	UDP glycosyltransferase family 2, member B10/UGT2B10	600009	NM_00107	****
sierases	UDP glycosyltransferase family 2, member B15/UGT2B15	690009	U06641	4q13
	UDP glycosyltransferase family 2, member B17/UGT2B17	601903	NM_00107 7	1914
	UDP glycosyltransferase 8/UGT8	601291	U30930	4q26
	UDP-glucuronosyltransferase	218800	AJ005162	Chr.2
Carbon Unit		250850	NM_00042 9	10q22
for SAM	methionine adenosyltransferase II, alpha/MAT2A	601468	NM_00591 1	2p11.2
	Folate Receptor Alpha/FOLR1	136430	M28099	1q13.3-q13.
	Folate Receptor Beta/FOLR2	136425	AF000380	1q13.3-q13.
	Folate Receptor Gamma/FOLR3	602469	Z32564	****
	Folate Transporter (SLC19A1)	600424	U19720	21q22.3
	Vitamin B12 binding protein	275350	Z	22q11.2-qte
	folylpolyglutamate synthetase/FPGS	136510	M98045	9cen-q34
	gamma-glutamyl hydrolase/GGH	601509	US5206	***

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Phase II
Drug
Metabolism
(conjugation
and
catabolism)

	olutamate			
	formiminotransferase/dihydrofolate			
	synthetase	229100	***	***
	catechol-O-methyltransferase/COMT	116790	NM_00075 4	22q11.2
Mothulation	phenylethanolamine N-methyltransferase/PNMT	171190	NM_00268 6	17q21-q22
incent jaunon	nicotinamide N- methyltransferase/NNMT	800009	NM_00616 9	11923.1
	Thiopurine methyltransferase (6-mercaptopurine detoxification)	187680	U12387	6p22.3
	pyruvate dehydrogenase E1-alpha subunit/PDHA1	312170	L48690	Xp22.2- p22.1
Carbon Unit	Carbon Unit beta/PDHB	179060	NM_00092 5	3p13-q23
for Acetyl-	pyruvate dehydrogenase complex, lipoyl-containing component X/E3-binding protein/PDX1	245349	NM_00347	11p13
	pyruvate dehydrogenase complex E3 subunit/DL.D	246900	NM_00010 8	7q31-q32
	sterol-O-acyl transferase 1/SOAT1	102642	L21934	1925
	sterol-O-acyl transferase 2/SOAT2	601311	****	chr. 12
Acylation	N-acetyltransferase 1/arylamide acetylase 1/NAT1	108345	NM_00066 2	8p23.1- p21.3
	N-acetyltransferase 2/arylamide acetylase 2/NAT2	243400	NM_00001 5	8p23.1- p21.3
	cystathionine-beta-synthase/CBS	236200	NM_00007	21q22.3

	cystathionase/cystathionine gamma-	219500	NM_00190	Chr.16
Glutathione Synthesis	glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), catalytic (72.8kD)/GLCLC	230450	NM_00149	6p12
	glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), regulatory (30.8kD)/GLCLR	601176	601176 NM_00206	1p22.1
	glutathione synthetase/GSS	601002	NM_00017 8	20q11.2
	Glutathione-S-transferase 6	138391	****	****
	Glutathione-S-transferase, alpha 1/GSTA1	138359	L13269	6p12.2
	Glutathione-S-transferase, alpha 2/GSTA2	138360	M15872	6p12.2
	Glutathione-S-transferase, kappa 1/GSTK1	602321	***	***
	Glutathione-S-transferase 1/MGST1 (microsomal)	138330	AH003674	Chr.12
	Glutathione-S-transferase 2/MGST2 (microsomal)	601733	NM_00241 3	4q28-q31
	Glutathione-S-transferase, mu 1- like/GSTM1L	138270	***	Chr. 3
	Olutanione-3-ualisiciase, inu 1./Cers 1.	138350	J03817	1p13.3
Glutathione Transferase	Glutathione-S-transferase, mu 2/GSTM2 (muscic)	138380	NM_00084 8	1p13.3
	Glutathione-S-transferase, mu 3/GSTM3 (brain)	138390	NM_00084 9	1p13.3
	Glutathione-S-transferase, mu 4/GSTM4	138333	NM_00085 0	1p13.3

	Glutathione-S-transferase, mu 5/GSTM5 (brain/lung)	138385	NM_00085 1	1p13.3
	Glutathione-S-transferase, pi/GSTP1	134660	NM_00085 2	11913
	Glutathione-S-transferase, theta	600436	NM_00085	22q11.2
	Glutathione-S-transferase, theta	600437	NM_00085 4	22q11.3
	Glutathione-S-transferase, zeta 1/maleylacetoactetate isomerase/MAAJ/GSTZ1	603758	NM_00151	14q24.3
γ.	Gamma-glutamyltranspeptidase 1/GGT1	231950	J04131	22q11.1- q11.2
Glutamyltra	Odinina-giutaniyinanspepnuase	137181	AH002728	22q11.1
nspeptidase		137168	NM_00412 1	* * * *
	paraoxonase 1/PON1 (arylesterase)	168820	AH004193	7q21.3
	paraoxonase 2/PON2	602447	L48513	7q21.3
	paraoxonase 3/PON3	602720	L48516	7q21.4
	esterase C/ESC (acetyl esterase)	133270	*****	***
	esterase A4/ESA4	133220	****	11q13-q22
	esterase B/buteryl esterase/ESB	133360	***************************************	***
	(erythrocyte)	122200		+
	esterase B3/ESB3	133290	***	Chr.16
	esterase			
	A5/A7/acetylesterase/ESA5/ESA7	133230	***	***
Esterases	(brain)			
	acetylcholinesterase/ACHE	100740	M55040	7q22

•					
		butyrylcholinesterase 1/serum			
		cholinesterase 1/BCHE1	177400	177400 NM_0000553q26.1-q26.2	3q26.1-q26.
		butyrylcholinestarase 2/serum		•	
		cholinesterase 2/BCHE2	177500	****	2q33-q35
		egasyn/esterase 22	129905	AF177775	***
		neuropathy target esterase/NTE	603197	603197 NM_006702	19p
		carboxylesterase 1/serine esterase/CES1 (hepatic)	114835	NM_00126 6	16q13- q22.1
Hydratases and Lyases	-	arylacetamide deacetylase/AADAC	600338	NM	3q21.3- q25.2
		acyl-CoA thioester hydrolase 1, long	703007	***************************************	****
		chain/acyl-CoA thioesterase 1/ACT1	007280		+ + + + +
		acyl-CoA thioester hydrolase 2, long	602587	****	****
		chain/acyl-CoA thioesterase 2/ACT2			
	Thioesterase	Thioesterase esterase D/ESD	133280	M13450	13q14.11
		hydroxyacyl glutathione hydrolase;			
		glyoxalase 2/HAGH	138760	138760 NM_005326	16p13
		esterase D/S-formylglutathion	133700	0372178	12~14 11
		hydrolase/ESC (thioesterase)	133200	M113430	13414.11
		aminoacylase 1/ACY1	104620	99000 ⁻ WN	3p21.1
	Amidase	aminoacylase 2/ACY2/aspartoacylase (Canavan disease)/ASPA	271900	NM_00004 9	17pter-p13
		fatty acid amide hydrolase/FAAH	602935	NM_00144 1	1p34-p35
	Epoxide	epoxide hydrolase 1/EPHX1 (microsomal)	132810	NM_00012 0	1p11-qter
	LLY UI ALASUS	cpoxide ilydiolase Zierniaz	132811	****	8p21-p12
	Proteases	bleomycin hydrolase/BLMH	602403	602403 NM_000386	17q11.2

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Microsomal triglyceride traprotein large subunit/MTP
Solute carrier family 6, member 6/SLC6A6 (taurine)
Solute carrier family 10, member 1/SLC10A1 (taurocholate)
Solute carrier family 10, member 2/SLC10A2 (taurocholate)
Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)
Solute carrier family 19, member 1/SLC19A1 (reduced folate)
Solute carrier family 21, member 3/SLC21A3 (organic anion)
Solute carrier family 22, member 1/SLC22A2 (organic cation)
multidrug resistance protein MDR1
multidrug resistance associated protein MRP2/CMOAT
multidrug resistancer glycoprotein 3/PGY3

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602938 NM_00170 604087 NM_00666 604087 NM_00666 603711 AF029403 182310 NM_00167 182340 NM_00167 182330 NM_00167 182331 X16645 601867 NM_00034 109270 2 109270 2 109270 2 109270 3 NM_00375			Bile acid Coerzyme A: amino acid N-			
choloyltransferase)/BAAT cytochrome P450, subfamily XLV1 Godorsterol 24-hydroxylase)/CYP46 Synthesis cytochrome P450, subfamily VIIA cytochrome P450, subfamily VIIA (cholesterol 7-a-hydroxylase), polypeptide 1/CYP7A1 cytochrome P450, subfamily VIIB (oxysterol 7-a-hydroxylase), polypeptide 1/CYP7B1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 Bolypeptide/ATP1B3 ATPase, Na+/K+ transporting, beta 3 ATPASE, Na+/K+			acyltransferase (glycine N-	602938	0/100 WN	9422.3
cytochrome P450, subfamily XLV1 Synthesis (cholesterol 24-hydroxylase)/CYP46 Synthesis (cholesterol 7-a-hydroxylase), polypeptide 1/CYP7A1 cytochrome P450, subfamily VIIA (cholesterol 7-a-hydroxylase), polypeptide 1/CYP7A1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 Solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 Solute carrier family 4, bicarbonate cotransporter, member 4/SLC4A4 Bile A/SLC4A4			choloyltransferase)/BAAT		-	
Bile Salt (cholesterol 24-hydroxylase)/CYP46 OCTOO 8 Synthesis cytochrome P450, subfamily VIIA 118455 M89803 polypeptide 1/CYP7A1 118455 M89803 polypeptide 1/CYP7B1 ATPase, Na+/K+ transporting, alpha 1 182310 NM_00070 polypeptide/ATP1A1 ATPase, Na+/K+ transporting, alpha 2 182340 NM_00167 polypeptide/ATP1A2 ATPase, Na+/K+ transporting, beta 1 182330 NM_00167 polypeptide/ATP1B1 ATPase, Na+/K+ transporting, beta 2 1823340 NM_00167 polypeptide/ATP1B2 ATPase, Na+/K+ transporting, beta 2 182331 X16645 ATPase, Na+/K+ transporting, beta 2 182331 NM_00167 polypeptide/ATP1B3 ATPase, Na+/K+ transporting, beta 3 601867 9 solute carrier family 4, bicarbonate/chloride anion exchanger, NM_0034 bicarbonate/chloride anion exchanger, 109270 2 solute carrier family 4, sodium solute carrier family 4, sodium 803345 NM_00375 Bile 4/SLC4A4 9			cytochrome P450, subfamily XLVI	604007	99900 MN	14.00.1
cytochrome P450, subfamily VIIA (cholesterol 7-a-hydroxylase), polypeptide 1/CYP7A1 (cytochrome P450, subfamily VIIB (oxysterol 7-a-hydroxylase), polypeptide 1/CYP7B1 (oxysterol 7-a-hydroxylase), polypeptide 1/CYP7B1 (ATPase, Na+/K+ transporting, alpha 1 182310 NM_00070 polypeptide-ATP1A1 (ATPase, Na+/K+ transporting, alpha 1 182340 NM_00167 polypeptide-ATP1A2 (ATPase, Na+/K+ transporting, beta 1 182330 NM_00167 polypeptide/ATP1B2 (ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 601867 polypeptide/ATP1B2 (ATPase, Na+/K+ transporting, beta 3 601867 polypeptide/ATP1B2 (ATPase, Na+/K+ transporting, beta 3 solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member 603345 bicarbonate cotransporter, member 603345 bille 4/SLC4A4		Bile Colt	(cholesterol 24-hydroxylase)/CYP46	00400	8	14432.1
(cholesterol 7-a-hydroxylase), 118455 M89803 polypeptide 1/CYP7A1 cytochrome P450, subfamily VIIB (oxysterol 7-a-hydroxylase), 603711 AF029403 polypeptide 1/CYP7B1 ATPase, Na+/K+ transporting, alpha 1 182310 NM_00070 polypeptide-like/ATP1A1 ATPase, Na+/K+ transporting, alpha 2 182340 NM_00167 polypeptide-like/ATP1A2 ATPase, Na+/K+ transporting, beta 1 182330 NM_00167 polypeptide/ATP1B1 ATPase, Na+/K+ transporting, beta 2 182331 X16645 polypeptide/ATP1B2 ATPase, Na+/K+ transporting, beta 3 601867 polypeptide/ATP1B3 ATPase, Na+/K+ transporting, beta 3 601867 polypeptide/ATP1B3 solute carrier family 4, sodium bicarbonate cotransporter, member 1/SLC4A4 solute carrier family 4, sodium bicarbonate cotransporter, member 603345 Bile 4/SLC4A4		Synthesis	cytochrome P450, subfamily VIIA			
polypeptide 1/CYP7A1 cytochrome P450, subfamily VIIB (oxysterol 7-a-hydroxylase), polypeptide 1/CYP7B1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 2 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 ATPASE, Na+/K+ transporting,		erecamp for	(cholesterol 7-a-hydroxylase),	118455		8q11-q12
cytochrome P450, subfamily VIIB (oxysterol 7-a-hydroxylase), polypeptide I/CYP7B1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 2 ATPase, Na+/K+ transporting, beta 1 Polypeptide/ATP1A2 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B1 ATPase, Na+/K+ transporting, beta 3 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B3 Solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 Solute carrier family 4, sodium bicarbonate cotransporter, member bicarbonate cotransporter, member ##Solute carrier family 4, sodium bicarbonate cotransporter, member ##Solute carrier family 4, sodium bicarbonate cotransporter, member			polypeptide 1/CYP7A1			
ATPase, Na+/K+ transporting, alpha 1 182310 NM_00070 ATPase, Na+/K+ transporting, alpha 1 182310 NM_00167 ATPase, Na+/K+ transporting, alpha 1 182360 NM_00167 Polypeptide/ATP1A1 182340 NM_00167 Polypeptide/ATP1B1 182330 NM_00167 Polypeptide/ATP1B1 182330 NM_00167 Polypeptide/ATP1B2 182331 X16645 Polypeptide/ATP1B2 182331 X16645 Polypeptide/ATP1B3 601867 9 Solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 Solute carrier family 4, sodium Paile 4/SLC4A4 W.L. AAA4 W.L. AAA4 Polypeptide/AAA4 N.M_00375 Paile 4/SLC4A4 N.M_00375 Paile 1/SLC4A4 N.M_00375 Paile 1/SLC4A1 N.M_00375 Paile 1/SLC4A1 N.M_003			cytochrome P450, subfamily VIIB			
ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 2 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B1 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B2 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B3 Solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 Solute carrier family 4, sodium bicarbonate cotransporter, member bicarbonate cotransporter, member 4/SLC4A4 Bile ATPASE, Na+/K+ transporting, alpha 2 Bile ATPASE, Na+/K+ transporting, beta 3 Bile ATPASE, Na+/K+ transporting, alpha 2 Bile Bile ATPASE, Na+/K+ transporting, alpha 2 Bile Bile ATPASE, Na+/K+ transporting, alpha 2 Bile Bile Bile ATPASE, Na+/K+ transporting, alpha 2 Bile Bile Bile Bile Bile Bile Bile Bile	:		(oxysterol 7-a-hydroxylase),	603711		8q21.3
ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 2 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 ATPASE, Nah, AT	Canalicular		polypeptide 1/CYP7B1			•
polypeptide/ATP1A1 ATPase, Na+/K+ transporting, alpha 1 ATPase, Na+/K+ transporting, alpha 2 ATPase, Na+/K+ transporting, beta 1 Polypeptide/ATP1A2 ATPase, Na+/K+ transporting, beta 1 Polypeptide/ATP1B1 ATPase, Na+/K+ transporting, beta 2 Polypeptide/ATP1B1 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B3 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B3 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B3 Solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 Solute carrier family 4, sodium bicarbonate cotransporter, member bicarbonate cotransporter, member bicarbonate cotransporter, member ##SLC4A4	Optake and Concentration		ATPase, Na+/K+ transporting, alpha 1	10001		1.1.2
ATPase, Na+/K+ transporting, alpha 1 182360 NM_00167 polypeptide-like/ATP1A1L ATPase, Na+/K+ transporting, beta 1 182330 ATPase, Na+/K+ transporting, beta 2 182331 NM_00167 polypeptide/ATP1B1 ATPase, Na+/K+ transporting, beta 2 182331 X16645 polypeptide/ATP1B2 ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3 ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3 Solute carrier family 4, bicarbonate/chloride anion exchanger, bicarbonate/chloride anion exchanger, bicarbonate cotransporter, member 4/SLC4A1 Solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4			polypeptide/ATP1A1	182310		rid-cidi
pólypeptide-like/ATP1A1L ATPase, Na+/K+ transporting, alpha 2 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B2 ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3 ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3 solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member bicarbonate cotransporter, member 4/SLC4A4	:		ATPase, Na+/K+ transporting, alpha 1	102250	NM_00167	13q12.1-
ATPase, Na+/K+ transporting, alpha 2 ATPase, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B2 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B3 Solute carrier family 4, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4 ASLC4A4	٠		polypeptide-like/ATP1A1L	182300	9	q12.3
polypeptide/ATP1A2 ATPasc, Na+/K+ transporting, beta 1 ATPasc, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3 Solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4 A/SLC4A4			ATPase, Na+/K+ transporting, alpha 2			
ATPasc, Na+/K+ transporting, beta 1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B2 ATPase, Na+/K+ transporting, beta 3 Polypeptide/ATP1B3 Solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 Solute carrier family 4, sodium bicarbonate cotransporter, member 603345 4/SLC4A4			polypeptide/ATP1A2			1921-923
polypeptide/ATP1B1 ATPase, Na+/K+ transporting, beta 2 ATPase, Na+/K+ transporting, beta 3 ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3 solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4 A/SLC4A4			ATPase, Na+/K+ transporting, beta 1	107770	NM 00167	100.1
ATPase, Na+/K+ transporting, beta 2 polypeptide/ATP1B2 ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3 solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member 603345 polypeptide/ATP1B3 solute carrier family 4, sodium bicarbonate cotransporter, member 603345 polypeptide/ATP1B2 solute carrier family 4, sodium bicarbonate cotransporter, member 603345 polypeptide/ATP1B2 polypeptide/ATP1B3 poly			polypeptide/ATP1B1	182330	7	c7b-77b1
polypeptide/ATP1B2 ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3 solute carrier family 4, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member bicarbonate cotransporter, member 4/SLC4A4 A/SLC4A4			ATPase, Na+/K+ transporting, beta 2	10001		
ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3 solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member 603345 WM_00375 4/SLC4A4			polypeptide/ATP1B2	185331		1/b
polypeptide/ATP1B3 solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4 4/SLC4A4			ATPase, Na+/K+ transporting, beta 3	60105		1
solute carrier family 4, bicarbonate/chloride anion exchanger, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4			polypeptide/ATP1B3	00100		
bicarbonate/chloride anion exchanger, member 1/SLC4A1 solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4			solute carrier family 4,		7 COOO 3 ALX	
solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4			bicarbonate/chloride anion exchanger,		NM_00034	
solute carrier family 4, sodium bicarbonate cotransporter, member 603345 9			member 1/SLC4A1	109270	7	17q21-q22
bicarbonate cotransporter, member 603345 111ML_00373 4/SLC4A4			solute carrier family 4, sodium		2000 PAIN	
4/SLC4A4			bicarbonate cotransporter, member	603345	C/ COO_ININI	4021
		Bile	4/SLC4A4		٥,	•

	Concentratio	Concentratio solute carrier family 4, sodium		NM 00378	
	=	olcaroonale cotransporter, member 5/SLC4A5	603318		4q21
		Solute carrier family 9, member A2/SLC9A2 (sodium/hydrogen ion)	600530	NM_00304 8	2q11.2
		Solute carrier family 9, member A3/SLC9A3 (sodium/hydrogen ion)	182307	* * *	5p15.3
		chloride channel 5/CLCN5	300008	NM_00008 4	Xp11.22
		chloride channel, calcium activated, family member 1/CLCA1	906209	603906 NM 001285 1p31-p22	1p31-p22
		chloride channel, calcium activated,			
		family member 2/CLCA2	604003	604003 NM_006536*****	***
•		cystic fibrosis transmembrane conductance regulator/CFTR	602421	NM_00049 2	7q31.2
		aquaporin 1/AQP1	107776	107776 NM_00038	7p14
		aquaporin 3/AQP3	600170	NM_00492 5	9p13
	Bila	Cholecystokinin/CCK	118440	118440 L00354	3pter-p21
	Secretion	Cholecystokinin A receptor/CCKAR	118444	118444 L13605	4p15.2-p15.
		Cholecystokinin B receptor/CCKBR	118445	118445 L08112	11p15.5-p15
		Cytoprasinic cystenic conjugate octa lyase/glutamine transaminase	600547	600547 NM_00405	Chr.9
		renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
		alanyl (microsomal) aminopeptidase/aminopeptidase M/ANPEP	151530	NM_00115 0	15q25-q26

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Excretion

	oaractosanmie (1v-acetyt)-0-sunate sulfatase (Morquio	253000	NM_00051	16q24.3
	Iduronate-2-sulfatase (Hunter syndrome)/IDS	309900	NM_00020 2	Xq28
Hydratases and Lyases	Arylsulfatase A/steroid sulfatase/ARSA	250100	NM_00048 7	22q13.31- qter
	Arylsulfatase B/steroid sulfatase/ARSB	253200	253200 NM_00004	5q11-q13
	Arylsulfatase C, isozyme s/steroid sulfatase/ARCS1	308100	NM_00035	Xp22.32
	outeron / A D.C.D.	300002	****	Xp22.3
	Arylsulfatase E/steroid sulfatase/ARSE	300180	NM_00004	Xp22.3
·	Arylsulfatase F/steroid sulfatase/ARSF	300003	300003 NM_00404	Xp22.3
	glucuronidase, beta/GUSB	253220	NM_00018	7q21.11
	renal transport of beta-amino acids/AABT	109660	* * * *	Chr.21
	Solute carrier family 3 member 1/SLC3A1 (aa transporter)	104614	**	2p16.3
	Solute carrier family 5 member 2/SLC5A5 (Na/glucose transporter)	182381	A56765	16p11.2
	Solute carrier family 6, member 6/SLC6A6 (taurine)	186854	U16120	3p25-q24
	Solute carrier family 7, member 9/SEC7A9 (neutral AA)	604144	**	19q13.1
Uptake and	Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)	604148	NM_00398 4	17p11.1-

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	Transporters	Transporters solute carrier family 17 (sodium phosphate), member 1/SLC17A1	182308	NM_00507	6p23-p21.3
		Solute carrier family 22, member 1/SLC22A2 (organic cation)	602607	NM_00305 8	6926
		Solute carrier family 22, member 1- like/SLC22A1L (organic cation)	602631	AF037064	11p15.5
		Solute carrier family 22, member 4/SLC22A4 (organic cation)	604190	604190 NM_00305	Chr. 5
		Solute carrier family 22, member 5/SLC22A5 (carnitine)	603377	NM_00306 0	5q33.1
		Solute carrier family 34, member		NM 00305	, ,
		1/SLC34A1 (sodium phosphate)	182309	_2	2435
		H+-ATPase beta 1 subunit /ATP6B1	267300	AH007312	2cen-q13
·		solute carrier family 4, sodium		NP4 00375	
	- 4	bicarbonate cotransporter, member 4/SLC4A4	603345	6	4q21
Renal		solute carrier family 4, sodium		NIM 00378	
Tubular		bicarbonate cotransporter, member		O/COO TAINI	
Uptake and		5/SLC4A5	603318	×o	4q21
Concentratio n		carbonic anhydrase II/CA2	259730	NM_00006	8q22
	Acidosis	carbonic anhydrase IV/CA4	114760	NM_00071	17923
		carbonic anhydrase XII/CA12	603263	AF051882	15q22
		solute carrier family 4,		NM 00034	
		bicarbonate/chloride anion exchanger,			
		member 1/SLC4A1	109270	7	17q21-q22
		Solute carrier family 9, member A1/SLC9A1 (sodium/hydrogen ion)	107310	M81768	1p36.1-p35

	Solute carrier family 9, member	600530	NM_00304	_
	A2/SLC9A2 (sodium/hydrogen ion)	occoo	8	7.11p2
	Solute carrier family 9, member		1	
	A3/SLC9A3 (sodium/hydrogen ion)	182307		5p15.3
Lithosis	Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)	604148	NM_00398 4	17p11.1-
Sodium Tolerance	3'(2'), 5'-bisphosphate nucleotidase 1/BPNT	604053	NM_00608 5	* * *
	chloride channel 5/CLCN5	300008	NM_00008 4	Xp11.22
	chloride channel Ka, kidney/CLCNKA 602024	602024	NM_00407 0	1p36
	chloride channel Kb, kidney/CLCNKB 602023	602023	NM_00008 5	1p36
	solute carrier family 12 (sodium/potassium/chloride transporters), member 1/SLC12A1	600839	NM_00033	15q15- q21.1
	solute carrier family 12 (sodium/potassium/chloride transporters), member 2/SLC12A2	600840	NM_00104	5q23.3
	(sodium/chio.ide transporters),	896009	NM_00033 9	16q13
	ATPase, Na+/K+ transporting, alpha 1 polypeptide/ATP1A1	182310	NM_00070 1	1p13-p11
Urine Concentratio		182360	NM_00167 6	13q12.1- q12.3
п	ATPase, Na+/K+ transporting, alpha 2 polypeptide/ATP1A2	182340	NM_00070 2	1921-923

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	ATPase, Na+/K+ transporting, beta 1 polypeptide/ATP1B1	182330	NM_00167 7	1922-925
	ATPase, Na+/K+ transporting, beta 2 polypeptide/ATP1B2	182331	X16645	17p
	ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3	601867	NM_00167 9	3q22-q23
	(nephrogenic diabetes	304800	NM_00005	Xq28
	aquaporin 1/AQP1	107776	NM_00038 5	7p14
	aquaporin 2/AQP2	107777	NM_00048 .6	12q13
	aquaporin 3/AQP3	600170	NM_00492 5	9p13
	aquaporin 6/AQP6	601383	NM_00165	12q13
	Superoxide Dismutase 1/SOD1 (soluble)	147450	NM_00045 4	21q22.1
 Superoxide Dismutase	Superoxide Dismutase 2/SOD2 (mitochondrial)	147460	X65965	6q25.3
	Superoxide Dismutase 3/SOD3 (extracellular)	185490	NM_00310	4pter-q21
	aldehyde dehydrogenase 1/ALDH1 (liver cytosol)	100640	AH002598	9q21
	aldehyde dehydrogenase 2/ALDH2 (liver mitochondria)	100650	K03001	12q24.2
	3/acetaldehyde	100660	M74542	17p11.2

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			aluchyuc uchyulogenase 5/acetaldehyde	100670	NM_00069	9p13
		Aldehyde Dehydrogen	aldehyde dehydr A1/succinic sem dehydrogenase/A	271980	271980 NM_00108	6p22
		ase		600463	NM_00069 3	15q26
			aucilyuc ucilyuiogenase 7/acetaldehyde	600466	NM_00069 4	11913
			dehyd	601917	NM_00069 5	chr. 11
			aldehyde dehydrogenase 9/g- aminobutyraldehyde dehydrogenase/ALDH9	602733	602733 NM_00069	1q22-q23
			aldehyde dehydrogenase 10/ALDH10	270200	NM_00038	17p11.2
		Aldehyde Dehydrogen ase	Aldehyde oxidase 1/AOX1	602841	NM_00115	2q33
Metabolism	Protection		glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), catalytic (72.8kD)/GLCLC	230450	NM_00149 8	6p12
of Reactive Oxygen and Nitrogen	from Reactive Oxygen and		glutamate-cysteine ligase (gamma- glutamylcysteine synthetase), regulatory (30.8kD)/GLCLR	601176	601176 NM_00206	1p22.1
Species	Nitrogen Species	Glutathione	glutathione synthetase/GSS	200109	NM_00017 8	20q11.2
			glutathione peroxidase/GPX1	138320	M21304	3p21.3
			glutathione peroxidase GPX2	138319	X68314	14q24.1:

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	glutathione peroxidase GPX3	138321	X58295	5q32-q33.1
	glutathione peroxidase GPX4	138322	X71973	19p13.3
	glutathione peroxidase GPX5	603435	AJ005277	***
	glutathione reductase	138300	X15722	8p21.1
	metallothionein 1A/MT1A	156350	NM_00595 3	16q13
	metallothionein 1B	56349	AH001510	16q13
	metallothionein 1E	156351	M10942	16q13
Metallothion	Metallothion metallothionein 1F	156352	M10943	16q13
ein	metallothionein 1G	156353	103910	16q13
	metallothionein 2A/MT2A	156360	NM_00595	16q13
	metallothionein 3	139255	NM_00595 4	16q13
	glucose-6-phosphate dehydrogenase/G6PD (mitochondrial)	305900	NM_00040 2	Xq28
	8-oxoguanine DNA glycosylase/CGG1	601982	NM_00254 2	3p26.2
	Peptide methionine sulfoxide reductase/MSRA	601250	***	***
Miscellaneou	succinate dehydrogenase complex, subunit C, integral membrane protein/SDHC	602413	NM_00300	1921
o	phospholipase A2 group IB/PLA2G1B	172410	NM_00092 8	12q23- q24.1
	lipoprotein, Lp(a)/LPA	152200	NM_00557	6q27
	Catalase/CAT	115500	NM_00175	11p13

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		thioredoxin-dependent peroxide reductase/TDPX1	600538	NM_00580 9	13q12
	IgE	interleukin 4 receptor/ILAR	147781	X52425	6p12.1-p11.2
	Production	interferon gamma/IFNG	147570	L07633	12q14
	Mast Cell	mast cell growth factor/MGF	184745	NM_00399 4	12q22
	Proliferation	Proliferation interleukin 9 receptor/IL9R	300007	M84747	Xq28
		interleukin 3 receptor/IL3R)	308385	M74782	Xp22.3
	<u>-</u>	mast cell IgE receptor alpha polypeptide/FCER1A	147140	***	1923
	Dogramletic	mast cell IgE receptor beta polypeptide/FCER1B	147138	NM_00013 9	11913
	n of Mast	mast cell IgE receptor beta polypeptide/FCER1G	147139	NM_00410 6	1q23
		SH2-containing inositol 5- phosphatase/SHIP	601582	US7650	2q36-q37
		secretory granule proteoglycan peptide core/PRG1	177040	J03223	10q22.1
		Histidine Decarboxylase	142704	M60445	15q21-q22
		Histamine receptor H1	600167	AF026261	3p21-p14
		Histamine receptor H2	142703	M64799	***
	Histamine	Histamine N-methyltransferase	****	D16224	chr. 2
		Amine oxidase (copper-containing) 2/AOC2	602268	D88213	17421
		Amine oxidase (copper-containing) 3/AOC3	603735	AF054985	17q21
		aromatic L-Amino Acid Decarboxylase/AADC	107930	107930 M76180	7p11

	tryptophan hydroxylase/TPH	191060	191060 X52836	11p15.3-p14
	14-3-3 protein ETA	113508	113508 X78138	22q12
	14-3-3 protein ZETA	601288	601288 M86400	2p25.2-p25.1
	14-3-3 protein BETA	601289	601289 X57346	20q13.1
	14-3-3 protein SIGMA	601290	601290 X57348	***
	serotonin 5-HT receptors 5-HT1A, G			
	protein-coupled	109760	109760 X57829	5q11.2-q13
	serotonin 5-HT receptors 5-HT1B, G			
	protein-coupled	182131	182131 M81590	6q13
	serotonin 5-HT receptors 5-HT1C, G			
	protein-coupled	312861	312861 U49516	Xq24
	serotonin 5-HT receptors 5-HT1D, G			
Serotonin	protein-coupled	182133	182133 M81590	1p36.3-p34.3
	serotonin 5-HT receptors 5-HT1E, G			
	protein-coupled	182132	182132 M91467	6q14-q15
	serotonin 5-HT receptors 5-HT1F, G			
	protein-coupled	182134	L05597	3p12
	serotonin 5-HT receptors 5-HT2A, G			
	protein-coupled	182135	182135 D87030	13q14-q21
	serotonin 5-HT receptors 5-HT2B, G			
	protein-coupled	601122 X77307		2q36.3-q37.1
	serotonin 5-HT receptors 5-HT2C, G			
	protein-coupled	312861	312861 U49516	Xq24
	serotonin transporter	182138 X70697	X70697	17q11.1-q12
	monoamine oxidase A/ MAOA	309850	309850 M69226	Xp11.23
	monoamine oxidase B MAOB	309860	309860 M69177	Xp11.23
	serotonin N-Acetyltransferase/SNAT	600950 U40347	U40347	1 <i>7</i> q25
	tryptophan 2,3-dioxygenase/TDO2	191070	191070 NM_005651	4q31-q32
				╢

Neutrophil	eotaxin precursor/small inducible			
and	cytokine, family A, member	601156	601156 U46572	7q21.1-q21.
Eosinophil	monocyte-derived-neutrophil			
Chemotaxis	chemotactic factor/interleukin 8/IL8	146930	146930 M26383	4q12-q13
	tryptase alpha/TPS1	191080	191080 NM_003293	3 Chr.16
Proteases	trýptase beta/TPS2	191081	191081 NM_003294	Chr.16
	chymase 1, mast cell/CMA1	118938	118938 NM_001836	14q11.2
	phospholipase A2 group IIA/PLA2G2A	172411	NM_00030 0	
Release of	phospholipase A2 group IB/PLA2G1B	172410	NM_00092 8	12q23- q24.1
Membrane Lipids	phospholipase A2 group X/PLA2G10	603603	* * *	16p13.1- p12
	phospholipase A2 group IVA/PLA2G4A	600522	U08374	1925
ene,	phospholipase A2 group VI/PLA2G6	603604	AF064594	22q13.1
.7	phospholipase A2 group IVC/PLA2G4C	603602	**	chr. 19
n painways)	phospholipase A2 group V/PLA2G5	601192	NM_00092 9	1p36-p34
	phospholipase C beta 3	600230	600230 U26425	11913
	lysosomal acid lipase	278000	278000 NM 000235	10q24-q25
	CDP-choline:alkylacetylglycerol cholinephosphotransferase	***	****	***
	platelet activating factor receptor/PTAFR	173393	M88177	1p35-p34.3
יין	platelet activating factor acetylhydrolase 1/PAFAH1	601690	NM_00508 4	6p21.2-p12

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riaieiei	Diatelet activating Jactor			
Activating Factor (PAF)	acetylhydrolase, isoform 1B, alpha	601545	NM_00043	17p13.3
	princic activating factor acetylhydrolase, isoform 1B, beta	602508	NM_00257	11923
	praiciet acutvatuig tactor acetylhydrolase, isoform 1B, gamma	603074	NM_00257 3	19q13.1
	platelet activating factor acetylhydrolase 2/PAFAH2	602344	NM_00043	* * * *
	arachidonate 5-lipoxygenase/ALOX5	152390	NM_00069 8	Chr.10
	arachidonate 5-lipoxygenase- activating protein/FLAP/ALOX5AP	603700	NM_00162 9	13q12
	leukotriene A4 hydrolase/LTA4H	151570	NM_00089 5	12q22
	leukotriene C4 synthase/LTC4S	246530	NM_00089	5693
Leukotriene	Gamma-glutamyltranspeptidase 1/GGT1	231950	J04131	22q11.1- q11.2
	Odmina-Brutaniyinalispepindase 2/CCT-3	137181	AH002728	22q11.1
	Gamma-glutamyltransferase-like activity 1/GGTLA1	137168	NM_00412 1	***
	renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
	cysteinyl leukotriene receptor 1/CYSLT1	300201	NM_00663 9	Xq13-q21
	leukôtriene b4 receptor (chemokine receptor-like 1)/LTB4R	601531	NM_00075	14q11.2- q12
**				

		prostaglandin endoperoxide synthetase			
		1/COX1/PTGS1	176805	176805 AH001520	9432-433.3
		prostaglandin endoperoxide synthetase	4)		
		2/COX2/PTGS2	600262	600262 NM_000963 1925.2-925.3	1q25.2-q25.3
		thromboxane A synthase 1/TBXAS1	274180	274180 SEG_D3461	7q34
		prostaglandin D2 synthase	602598	602598 M61900	***
		prostaglandin I2 synthase/prostacyclin			
		synthase/PTGIS	601699	601699 SEG_D8339	20q13
		prostaglandin E receptor 1, EP1			
		subtype/PTGER1	176802	176802 NM_000955	19p13.1
		prostaglandin E receptor 2, EP2			
	Prostaglandi	Prostaging subtype/PTGER2	176804	176804 *****	5p13.1
	i i Ostagianui ne	prostaglandin E receptor 3, EP3			
		subtype/PTGER3	176806	176806 NM_000957	1p31.2
		prostaglandin E receptor 4, EP4			
		subtype/PTGER4	601586	601586 NM_000958	5p13.1
Mast Cell		prostaglandin F receptor/PTGFR	600563	600563 L24470	1p31.1
and T-Cell		prostaglandin F2 receptor negative			
Response		regulator/PTGFRN	601204	601204 U26664	1p13.1-q21.3
		prostaglandin 12			
		receptor/PTGIR/prostacyclin receptor	600022	600022 SEG_HUMI	19q13.3
		15-hydroxyprostaglandin			
·		dehydrogenase/HPGD	601688	601688 NM_000860	4q34-q35
		aldo-keto reductase family 1, member			
		C2/AKR1C2	600450	600450 NM_001353	10p15-p14
		myeloperoxidase/MPO	254600	102694	17q23.1
		eosinophil peroxidase/EPX	131399	NM_00050	***
:	- T				

Viug	calreticulin/CALR	109091	CALR	19p13.2
Acuvanon	calnexin/CANX	114217	L18887	5q35
	ceruloplasmin (ferroxidase)/CP	117700	NM_00009 6	3q21-q24
	MHC class II transactivator/MHC2TA	600005	NM_00024 6	16p13
	MHC class II HLA DR-alpha chain/HLA-DRA	142860	X83114	6p21.3
	MHC class II HLA DR-beta chain/HLA-DRB	142857	M11161	6p21.3
	MHC class II HLA DP-alpha chain/HLA-DPA	142880	M23905	6p21.3
	MHC class II HLA DP-beta chain/HLA-DPB	142858	AH002893	6p21.3
	MHC class II HLA DM-alpha chain/HLA-DMA	142855	NM_00612 0	6p21.3
Antigen	MHC class II HLA DM-beta chain/HLA-DMB	142856	NM_00211 8	6p21.3
Presentation	Presentation MHC class II HLA DQ-alpha chain/HLA-DQA	146880	M11124	6p21.3
	MHC class II HLA DQ-beta chain/HLA-DQB	***	M24364	6p21.3
	MHC class II HLA DN-aipha chain/HLA-DNA	142930	X02882	6p21.3
	MHC class II HLA DO-beta chain/HLA-DOB	600629	NM_00212 0	6p21.3
	MHC class II antigen gamma chain/CD74	142790	K01144	5q32

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	anugen pepude transporter I/MHC 1/TAP1	170260	NM_00059	6p21.3
	antigen peptide transporter 2/MHC 2/TAP2	170261	NM_00054 4	6p21.3
	T-cell antigen receptor, alpha subunit/TCRA	186880	Z24457	14q11.2
	T-cell antigen receptor, beta subunit/TCRB	186930	AF011643	7q35
	T-cell antigen receptor, gamma subunit/TCRG	186970	M17325	7p15-p14
	T-cell antigen receptor, delta subunit/TCRD	186810	L36384	14q11.2
T-Cell Receptor	thymocyte antigen receptor complex CD3G, gamma polypeptide (TiT3 complex)/CD3G	186740	186740 NM_00007	11923
	thymocyte antigen receptor complex CD3D, delta polypeptide (TiT3 complex)/CD3D	186790	186790 NM_00073	11923
	thymocyte antigen receptor complex CD3E, epsilon polypeptide (TiT3 complex)/CD3E	186830	NM_00073	11923
	thymocyte antigen receptor complex CD3Z, zeta polypeptide (TiT3 complex)/CD3Z	186780	NM_00073	1922-923
	ataxia telangiectasia mutated (includes complementation groups A, C and		NM 00005	
	D)/ATM	208900	_1	11q22.3
	recombination activating gene	179615	NM_00044 8	11p13

	recomonation activating gene o.m.a.c.o	179616	M94633	11p13
	interleukin 7 receptor/IL/R	146661	NM_00218 5	5p13
T. Coll	v-myb avian myeloblastosis viral oncogene homolog/MYB	189990	NM_00537 5	6q22
Receptor Rearrangem	core binding factor, alpha 1 subunit/CBFA1	600211	AH005498	6p21
ent	core-binding factor, beta subunit/PEBP2B/CBFB	121360	L20298	16922
	ligase I, DNA, ATP-dependent/LIG1	126391	NM_00023 4	19q13.2- q13.3
	ligase IV, DNA, ATP-dependent/LIG4 601837	601837	NM_00231	13q22-q34
	X-ray repair, complementing defect in Chinese hamster/Ku antigen, 80			
	kD/KU80/XRCC5	194364	***	2q35
	thyroid autoantigen, 70 kD/KU70/G22P1	152690	NM_00146	22011-012
	T-cell antigen T4/CD4	186940	X87570	12ntor 112
	T-cell antigen CD8, alpha polypeptide (p32)/CD8A	186910	NM_00176	2ptd-p12
	T-cell antigen CD8, beta polypeptide/CD8B	186730	AH003859	2p12
	T-cell antigen CD28 (Tp44)/CD28	186760	NM_00613	2q33-q34
	cytotoxic T-lymphocyte-associated 4/CTLA4	123890	L15006	2q33

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	3921	3921	2412	1q31-q32	18q23	20q13.2- q13.3	16q13-q24	* * * * *	10p15-p14	22q11.2-q13	Xq13	1q21	Xq28	Chr.X	Xq24	10p15-p14	19q13.1-q13	1941	14q24	6p21.3
	NM_00519	NM_00688 9	S69911	M23492	NM_00616 2	****	L41066	L41067	X01057	M26062	D11086	X12830	M84747	S80963	X95302	U31628	M60315	190220 M19154	190230 X14149	153440 NM_000595
	112203	601020	176947	151460	600489	600490	602698	602699	147730	146710	308380	147880	300007	300119	300130	601070	190180	190220	190230	153440
Militar i Militario de Maria d	CD80 antigen (CD28 antigen ligand 1, B7-1 antigen)/CD80	CD86 antigen (CD28 antigen ligand 2, B7-2 antigen)/CD86	T cell receptor-associated protein tyrosine kinase ZAP-70/ZAP70	TEUROCYTE COMMON ANUBER	nuclear factor of activated T-cells, cytoplasmic 1/NFATC1	nuclear factor of activated T-cells, cytoplasmic 2/NFATC2	L-Cell nuclear factor of activated T-cells, cytoplasmic 3/NFATC3	nuclear factor of activated T-cells, cytoplasmic 4/NFATC4	interleukin 2 receptor alpha/IL2RA	interleukin 2 receptor beta/IL2RB	interleukin 2 receptor gamma/IL2RG	interleukin 6 receptor/IL6R	interleukin 9 receptor/IL9R	interleukin receptor 13 alpha/IL13RA1	interleukin receptor 13 alpha2/IL13RA	interleukin 15 receptor alpha/IL15RA	transforming growth factor/TGFB1	transforming growth factor/TGFB2	transforming growth factor/TGFB3	tumor necrosis factor beta/TNFB/lymp

Immune
Response
(additional
genes in
Immunology)

	tumor necrosis factor ligand superfamily, member 6/TNFSF6	134638	NM_00063	1923
	tumor necrosis factor receptor superfamily, member 6/TNFRSF6	134637	Σ	10q24.1
	caspase 10, apoptosis-related cysteine protease/CASP10	601762	NM_00123	2q33-q34
	B-cell antigen CD20/B-lymphocyte differentiation antigen B1/CD20	112210	112210 AH003353	11913
	B-cell antigen CD72/CD72	107272	NM_00178 2	d ₆
	natural resistance-associated macrophage protein 1/NRAMP1/solute carrier family 11, momber 1/SI C11 A1	600266	600266 AH002806	2q35
	macrophage protein 2/NRAMP2/solute carrier family 11,	600523	AB015355	12q13
	T-lymphocyte antigen CDW52 (CAMPATH-1 antigen)/CDW52	114280	NM_00180	**
	B-cell antigen CD22/CD22	107266	NM_00177	19913.1
	D-cell alligell CD24/CD02	600074	X69397	6q21
Receptors	leukocyte antigen CD156/disintegrin and metalloprotease domain 8/ADAM8/CD156	602267	602267 NM_00110	10q26.3
	platelet antigen CD151/plateletendothelial cell tetraspan antigen 3/PETA3/CD151	602243	NM_00435	11p15.5

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	IIA for Fc fragment of		NM_00400	
	IgG/FCGR2A/CD32	146790		1q21-q23
	activated leucocyte cell adhesion molecule/CD6 ligand/ALCAM	601662	NM_00162	3q13.1- a13.2
*	lymphocyte antigen CD79A/immunoglobulin-associated		NM 00178	
٠.	alpha/CD79A	112205		19q13.2
	lymphocyte antigen CD79B/immunoglobulin-associated			
	beta/CD79B	147245	L27587	17q23
Signalling	regulator of G-protein signalling 1/RGS1	600323	NM_00292 2	1431
	immunoglobulin K light chain constant region locus/IGKC	147200	***	2p12
	immunoglobulin K light chain variable region locus/IGKV	146980	K01322	2p12
Immunoglob	immunoglobulin K light chain joining region locus/IGKJ	146970	* * * *	2p12
Chains	immunoglobulin L light chain constant region locus/IGLC1	147220	NM_00614 6	22q11.2
	immunoglobulin L light chainjoining region locus/IGLJ	147230	NM_00614 6	22q11.2
	immunoglobulin L light chain variable region locus/IGLJ	147240	NM_00614 6	22q11.2
	immunoglobulin A heavy chain constant region locus 1/IGHA1	146900	* * * *	14q32.33
	immunoglobulin A heavy chain constant region locus 2/IGHA2	147000	****	14q32.33

Immunoglobulin D heavy chain constant region locus/IGHD I47180 Immunoglobulin B heavy chain constant region locus/IGHE I47180 Immunoglobulin G heavy chain constant region locus I/IGHG1 I47110 I47110 Immunoglobulin G heavy chain constant region locus I/IGHG3 I47110 I47120 Immunoglobulin G heavy chain constant region locus I/IGHG4 I47120 I47120 I47123 I47123 Immunoglobulin G heavy chain constant region locus I/IGHG4 I47070 I47020 I47023 I47020 I470200 I4702		li				_		1		1		11			G B
immunoglobulin D heavy chain constant region locus/IGHD imnunoglobulin E heavy chain constant region locus I/IGHGI immunoglobulin G heavy chain constant region locus 2/IGHG2 immunoglobulin G heavy chain constant region locus 3/IGHG3 immunoglobulin G heavy chain constant region locus 3/IGHG4 immunoglobulin G heavy chain constant region locus 4/IGHG4 immunoglobulin M heavy chain constant region locus 4/IGHG4 immunoglobulin heavy chain variable immunoglobulin heavy chain variable region locus 1/IGHV1 immunoglobulin heavy chain diversity region locus 2/IGHV2 immunoglobulin heavy chain joining region locus 2/IGHDY1 immunoglobulin heavy chain joining region locus 2/IGHDY2 immunoglobulin heavy chain joining region locus 2/IGHJY2 immunoglobulin heavy chain joining region locus 2/IGHJY2 immunoglobulin heavy chain joining region locus 2/IGHJY2 immunoglobulin heavy chain joining recombination activating gene 1/79615	14q32.33	14q32.33	14q32.33	14q32.33	14q32.33	14q32.33	14q32.33	14q32.33	16p11	14q32.33	15q11-q12	14q32.33	11p13.	11p13	
immunoglobulin D heavy chain constant region locus/IGHD imnunoglobulin E heavy chain constant region locus I/IGHGI immunoglobulin G heavy chain constant region locus 2/IGHG2 immunoglobulin G heavy chain constant region locus 3/IGHG3 immunoglobulin G heavy chain constant region locus 3/IGHG4 immunoglobulin G heavy chain constant region locus 4/IGHG4 immunoglobulin M heavy chain constant region locus 4/IGHG4 immunoglobulin heavy chain variable immunoglobulin heavy chain variable region locus 1/IGHV1 immunoglobulin heavy chain diversity region locus 2/IGHV2 immunoglobulin heavy chain joining region locus 2/IGHDY1 immunoglobulin heavy chain joining region locus 2/IGHDY2 immunoglobulin heavy chain joining region locus 2/IGHJY2 immunoglobulin heavy chain joining region locus 2/IGHJY2 immunoglobulin heavy chain joining region locus 2/IGHJY2 immunoglobulin heavy chain joining recombination activating gene 1/79615	**	***	***	***	****	**	****	X92279	***	X97051	L25544	* * * * *	NM_00044 8	M94633	
	147170	147180	147100	147110	147120	147130	147020	147070	600949	146910	146990	147010		179616	
	immunoglobulin D heavy chain constant region locus/IGHD	immunoglobulin E heavy chain constant region locus/IGHE	immunoglobulin G heavy chain constant region locus 1/1GHG1	immunoglobulin G heavy chain constant region locus 2/IGHG2			immunoglobulin M heavy chain constant region locus/IGHM	immunoglobulin heavy chain variable region locus 1/IGHV1	immunoglobulin heavy chain variable region locus 2/IGHV2	immunoglobulin heavy chain diversity region locus 1/IGHDY1	immunoglobulin heavy chain diversity region locus 2/IGHDY2	immunoglobulin heavy chain joining region locus/IGHJ	recombination activating gene	ורכיסווסווומנוסוו מכנועמנוווע צפוופ ירביא מירן	

		immunoglobulin kappa J region recombination signal binding protein/RBPJK/IGKJRB1	147183	L07872	9p13-p12
		Bruton agammaglobulinemia tyrosine kinase/BTK	300300	NM_00006 1	Xq21.3-q22
		interleukin 7 receptor/IL7R	146661	NM_00218 5	5p13
	Tmmunooloh	interferon-gamma receptor 1/IFNGR1	107470	NM_00041 6	6923-924
B-Cell Response	ulin Gene Rearrangem	interferon-gamma receptor 2/IFNGR2 147569	147569	NM_00553 4	21q22.1- q22.2
	ent	interleukin 4 receptor precursor/IL4R	147781	NM_00041 8	16p12.1- p11.2
		interleukin 4 receptor precursor/ILAR	147781	NM_00041 8	16p12.1- p11.2
		ligase I, DNA, ATP-dependent/LIG1	126391	NM_00023 4	19q13.2- q13.3
		ligase IV, DNA, ATP-dependent/LIG4 601837	601837	NM_00231	13q22-q34
		X-ray repair, complementing defect in Chinese hamster/Ku antigen, 80			
		kD/KU80/XRCC5	194364	****	2q35
		thyroid autoantigen, 70 kD/KU70/G22P1	152690	NM_00146 9	22q11-q13
		nuclear factor kappa-B DNA binding subunit 1/NFKB1	164011	M58603	4q23-q24
		nuclear factor kappa-B DNA binding subunit 2/NFKB2	164012	NM_00250 2	10q24

	nuclear factor kappa-B subunit 3/NFKB3	164014	Z22949	11q12-q13
	nuclear factor of kappa light chain gene enhancer in B cells, inhibitor alpha/NFKBIA	164008	* * * * *	14q13
·	nuclear factor of kappa light chain gene enhancer in B cells, inhibitor beta/NFKBIB	603258	NM_00250	8p11.2
	YY1 transcription factor/YY1	600013	NM_00340 3	14q
Immunoglob ulin Gene	Immunoglob immunoglobulin transcription factor ulin Gene 1/ITF1/transcription factor 3/TCF3	147141	***	19p13.3
Transcriptio n	Transcriptio immunoglobulin transcription factor n 2/ITF2/transcription factor 4/TCF4	602272	NM_00319 9	18q21.1
	immunoglobulin mu binding protein 2/IGHMBP2	600502	NM_00218 0	11q13.2- q13.4
	transcription factor binding to IGHM enhancer 3/TFE3	314310	NM_00652 1	Xp11.22
	homeobox protein OCT1/POU domain transcription factor 2, class 1/POU2F1	164175	NM_00269 7	1922-923
	homeobox protein OCT2/POU domain transcription factor 2, class 2/POU2F2	164176	M22596	Chr.19
	POU domain, class 2, associating factor 1/POU2AF1	601206	NM_00623 5	11923.1
		600349	NM_00216 5	20q11,
	inhibitor of DNA binding 2, dominant negative helix-loop-helix protein/ID2	600386	NM_00216 6	2p25

	B-cell antigen CD40/tumor necrosis			
	factor receptor superfamily, member		NM 00125	20012-
	S/CD40/TINFRSF5	109535		q13.2
	paired box gene 5/B-cell lineage-			
	specific activator protein/BSAP/PAX5	167414	***	9p13
	lymphocye function-associated		NM_00177	
	antigen, type 3/LFA3/LEU7/CD58	153420	6	1p13
	interleukin 10 receptor, alpha/IL10RA	146933	NM_00155 8	11923.3
	lymphocyte antigen CD45/protein			
	tyrosine phosphatase, receptor type, c		NM_00283	
	polypeptide/PTPRC/CD45	151460	8	1q31-q32
	prostaglandin E receptor 1, EP1			
	subtype/PTGER1	176802	176802 NM_000955	19p13.1
	prostaglandin E receptor 2, EP2			
	subtype/PTGER2	176804	****	5p13.1
	prostaglandin E receptor 3, EP3			
	subtype/PTGER3	176806	176806 NM_000957	1p31.2
mminoglob	prostaglandin E receptor 4, EP4			
ulin Isotyne	subtype/PTGER4	601586	601586 NM_000958	5p13.1
Switching	interleukin 13 receptor, alpha 1/IL13RA1	300119	NM_00156 0	Chr.X
	interleukin receptor 13 alpha2/IL13A2	300130	X95302	Xq24
	interferon-gamma receptor 1/IFNGR1	107470	NM_00041 6	6q23-q24
	interferon-gamma receptor 2/IFNGR2	147569	NM_00553 4	21q22.1- q22.2
	interleukin 5 receptor alpha/IL5RA	147851	M96652	3p26-p24:

	1 1, 2 1,			
	receptor I (activin A receptor type II-like kinase, 53kD)/TGFBR1		190181 NM_00461	9q33-q34
	transforming growth factor, beta receptor II (70-80kD)/TGFBR2	190182	NM_00324 2	3p22
	receptor III (betaglycan,	600742	NM_00324 3	1p33-p32
-	X-ray repair, complementing defect in Chinese hamster/Ku antigen, 80			
	kD/KU80/XRCC5	194364	****	2q35
	thyroid autoantigen, 70		NM_00146	
	kD/KU70/G22P1	152690	6	22911-913
	granulocyte-macrophage colony stimulating factor 2/CSF2	138960	NM_00075 8	5q31.1
	macrophage-specific colony- stimulating factor/CSF1	120420	AH005300	1p21-p13
	granulocyte colony stimulating factor 3/CSF3	138970	NM_00075	17q11.2- q12
	colony stimulating factor 1 receptor/CSFR1	164770	U63963	5q33.2- q33.3
	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, low-affinity/CSF2RA	306250	NM_00614 0	Xp22.32
	granulocyte-macrophage colony stimulating factor 2 receptor, beta/CSF2RB	138981	U18373	22q12.2- q13.1
	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, Y chromasomal/CSF2RY	425000	**	Yp11

	358 19q13.3	0395 *****	0079 7q21	2012 19p13.3- p13.2	2497 9p24)584 *****	1010 19q13.2	17q11.2	15 *****	3926.3-927)537 lp34)411 13q12
	7 U03858	6 NM_00395 5	0 NM_00079	1 NM_00012 1	6 NM_00497	* NM_00584	4 NM_00101	1 NM_00315	9 Z23115	4 NM_00046 0	159530 NM_00537	I NM_00411
	600007	I- 604176	133170	133171	147796	* * * *	603474	601511	600039	600044	15953	136351
	flt3 ligand/FMS-related tyrosine Granulocyte, kinase 3 ligand/FLT3LG	Macrophage, STAT induced STAT inhibitor 3/SSI-Erythrocyte, 3	and Platelet erythropoietin/EPO	on erythropoietin receptor/EPOR	Janus kinase 2 (a protein tyrosine kinase)/JAK2	STAM-like protein containing SH3 and ITAM domains 2/STAM2	ribosomal protein S7/RPS7	signal transducer and activator of transcription 5A/STAT5A	BCL-X/BCLX	thrombopoietin (MLV oncogene ligand, megakaryocyte growth and development factor)/THPO	myeloproliferative leukemia virus oncogene/MPL/thrombopoietin receptor/TPOR	FMS-related tyrosine kinase 3/FLT3
		Myeloid	on on	. •								
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		Ë	Table 4. Inflammation Gene List	ne List			
ass	Pathway	Function	Name)	OMIM	GID	Locus

		MHC class I HLA A/HLA-A	142800	142800 AF148863	6p21.3
		MHC class I HLA B/HLA-B	142830	NM_00551 4	6p21.3
•	Major	MHC class I HLA C/HLA-C	142840	AF168611	6p21.3
=	Histocompat ibility	MHC class I HLA E/HLA-E	143010	NM_00551 6	6p21.3
	Complex I	MHC class I HLA F/HLA-F	143110	X17093	6p21.3
		MHC class I HLA G/HLA-G	142871	AH005893	6p21.3
		beta-2-microglobulin/B2M	109700	NM_00404 8	15q21-q22
	Major	thymocyte antigen CD1A/CD1A	188370	AF142665	1921-923
H	Histocompat		188360	AF142666	1q21-q23
(ibility	thymocyte antigen CD1C/CD1C	188340	AF142667	1q21-q23
<u>.</u>	Complex I-	thymocyte antigen CD1D/CD1D	188410	AF142668	1q21-q23
	Kelated	Inymocyte antigen CD1E/CD1E	188411	AF142669	1q21-q23
		interferon-gamma receptor 1/IFNGR1	107470	NM_00041 6	6q23-q24
		interferon-gamma receptor 2/IFNGR2 147569	147569	NM_00553 4	21q22.1- q22.2
W	HC Class I	MHC Class I TATA box binding protein (TBP)-			
ıŢ	anscriptio	I ranscriptio associated factor, RNA polymerase II, n A, 250kD/TAF2A	313650	NM_00460	Vo12
		interferon regulatory factor 1/IRF1	147575	NM_00219	5q31.1
		nuclear factor kappa-B DNA binding subunit 2/NFKB2	164012	NM_00250	10q24
		MHC class II HLA DR-alpha			
		chain/HLA-DRA	142860	X83114	6p21.3

×	MHC class II HLA DR-beta chain/HLA-DRB	142857	M11161	6p21.3
	MHC class II HLA DP-alpha chain/HLA-DPA	142880	M23905	6p21.3
	MHC class II HLA DP-beta chain/HLA-DPB	142858	AH002893	6p21.3
	MHC class II HLA DM-aipha chain/HLA-DMA	142855	NM_00612 0	6p21.3
Major	MHC class II HLA DM-beta chain/HLA-DMB	142856	MN.	6p21.3
Histocompat ibility	Histocompat MHC class II HLA DQ-alpha ibility chain/HLA-DQA	146880	M11124	6p21.3
Complex II	MHC class II HLA DQ-beta chain/HI,A-DQB	* * * * *	M24364	6p21.3
	MHC class II HLA DN-alpha chain/HLA-DNA	142930	X02882	6p21.3
	MHC class II HLA DO-beta chain/HLA-DOB	600629	NM_00212 0	6p21.3
	MHC class II antigen gamma chain/CD74	142790	K01144	5q32
	antigen peptide transporter 1/MHC 1/TAP1	170260	NM_00059	6p21.3
	antigen peptide transporter 2/MHC 2/TAP2	170261	NM_00054 4	6p21.3
	interferon-gamma receptor 1/JFNGR1	107470	NM_00041 6	6q23-q24
	interferon-gamma receptor 2/IFNGR2	147569	NM_00553 4	21q22.1- q22.2
	regulatory factor X, 5 (influences HLA class II expression)/RFX5	601863	NM_00044 9	1q21.1- q21.3

16p13	13q14	19p12	19p13.3- p13.2	**	6p21.3	12q22-q23	14q11.2	7q35	7p15-p14	14q11.2	11923	11q23
NM_00024 6	NM_00053 8	NM_00372 1	*****	NM_00250 4	NM_00250 5	NM_00616 6	Z24457	AF011643	M17325	L36384	NM_00007	NM_00073
900009	601861	603200	142765	603255	189903	189904	186880	186930	186970	186810	186740	186790
MHC class II transactivator/MHC2TA 600005 NM_00024	ss regulatory factor X-associated protein/RFXAP	Transcriptio regulatory factor X-associated ankyrin-nontaining protein/RFXANK	regulatory factor X, 2 (influences HLA class II expression)/RFX2	nuclear transcription factor, X-box binding I/NFX1	nuclear transcription factor Y, alpha/NFYA	nuclear transcription factor Y, beta/NFYB	T-cell antigen receptor, alpha subunit/TCRA	T-cell antigen receptor, beta subunit/TCRB	T-cell antigen receptor, gamma subunit/TCRG	T-cell antigen receptor, delta subunit/TCRD	thymocyte antigen receptor complex CD3G, gamma polypeptide (TiT3 complex)/CD3G	thymocyte antigen receptor complex CD3D, delta polypeptide (TiT3 complex)/CD3D
	MHC Class II	Transcript n									T-Cell Antigen	Receptor Complex
				Antigen Presentation	and Recognition							
			Tmmine	Discriminati	(Self vs Non-							

					_										
11q23	1q22-q23	1p13.1		11922.3	11p13	11p13	5p13		6q22	6p21	16022	19q13.2- a13.3	13q22-q34		2q35
186830 NM_00073	186780 NM_00073	NM_00176 7		NM_00005	NM_00044 8	M94633	NM_00218 5	NM_00537	5	AH005498	1,20298	NM_00023	NM_00231		***
186830	186780	186990		208900	179615	179616	146661		189990	600211	121360	126391	601837		194364
thymocyte antigen receptor complex CD3E, epsilon polypeptide (TiT3 complex)/CD3E	thymocyte antigen receptor complex CD3Z, zeta polypeptide (TiT3 complex)/CD3Z	(p50), sheep red blood cell receptor/CD2	ataxia telangiectasia mutated (includes	complementation groups A, C and D)/ATM	recombination activating gene	15combination activating gene	interleukin 7 receptor/IL7R	v-myb avian myeloblastosis viral	Rearrangem oncogene homolog/MYB	ent of T-Cell core binding factor, alpha 1 Antigen subunit/CBFA1	core-binding factor, beta	ligase I, DNA, ATP-dependent/LIG1	ligase IV, DNA, ATP-dependent/LIG4	X-ray repair, complementing defect in Chinese hamster/Ku antigen, 80	kĎ/KU80/XRCC5
									Rearrangem	ent of T-Cell Antigen	Receptor Complex	•			

		thyroid autoantigen, 70 kD/KU70/G22P1	152690	NM_00146 9	22q11-q13
	_	GATA-binding protein 3/GATA3	131320	NM_00205 1	10p15
		long form transcription factor C-MAF/CMAF	* * * *	AF055377	***
	Transcription of T-Cell	B-cell antigen CD25/interleukin 2 receptor, alpha chain/IL2RA/CD25	147730	10p15-p14	10p15-p14
· · · · · · · · · · · · · · · · · · ·	Antigen Receptor	interleukin 2 receptor, beta/IL2RB	146710	NM_00087 8	22q11.2- q13
	Complex	interleukin 2 receptor, gamma chain/IL2RG	308380	NM_00020 6	
		transcription factor 1/hepatic nuclear factor /HNF1/albumin proximal factor/TCF1	142410	NM_00054 5	12q24.2
	B-Cell Antigen	lymphocyte antigen CD79A/immunoglobulin-associated alpha/CD79A	112205	NM_00178	19q13.2
	Receptor Complex	lymphocyte antigen CD79B/immunoglobulin-associated beta/CD79B	147245	L27587	17q23
		interferon regulatory factor 1/IRF1	147575	NM_00219 8	5q31.1
		interferon regulatory factor 2/IRF2	147576	NM_00219 9	4q35.1
		interferon consensus sequence binding protein 1/ICSBP1	601565	NM_00216	****
		interferon alpha 1/IFNA1	147660	X02956	9p22
		interferon alpha 2/IFNA2	147562	Y11834	9p22

	-	interferon clube 4/IDMA 4	1 175 (1	111111	
		mericion alpha 4/1FIVA4	14/304		3p22
		interferon alpha 5/IFNA5	147565	NM_00216 9	9p22
		interferon alpha 6/IFNA6	147566	****	9p22
	.	interferon alpha 7/IFNA7	147567	****	9p22
		interferon alpha 8/JFNA8	147568	NM_00217 0	9p22
	Synthesis	interferon alpha 10/IFNA10	147577	147577 NM_00217	9p22
		interferon alpha 13/IFNA13	147578	06900_NM 0	9p22
Interferons		interferon alpha 14/IFNA14	147579	NM_00217 2	9p22
•		interferon alpha 16/IFNA16	147580	.NM_00217 3	9p22
		interferon alpha 17/IFNA17	147583	****	9p22
		interferon alpha 21/IFNA21	147584	147584 NM_00217 5	9p22
	·	interferon beta 1/IFNB1	147640	NM_00217 6	9p21
		interferon beta 3/IFNB3	147860	K03196	Chr.8
		interferon gamma/IFNG	147570	L07633	12q14
		interferon omega 1/IFNW1	147553	NM_00217 7	9p21
		interferon (alpha, beta and omega) receptor 1/IFNAR1	107450	X77722	21q22.1
	Recentors	interferon (alpha, beta and omega) receptor 2/IFNAR2	602376	NM_00087 4	21q22.1
		interferon-gamma receptor 1/IFNGR1 107470	107470	NM_00041 6	6q23-q24

		interferon-gamma receptor 2/IFNGR2 147569	147569	NM_00553	21q22.1-
		interleukin enhancer binding factor 1/ILF1	147685	147685 NM_00451	17925
		interleukin enhancer binding factor 2, 45 kD/ILF2	603181	NM_00451 5	* * *
		interleukin enhancer binding factor 3, 90 kD/ILF3	603182	NM_00451 6	***
		interleukin 1 alpha/IL1A2	147761	M15330	3q14
		interleukin 1 beta/IL1B	147720	AF043335	2q14
		apoptosis-related cystein protease 1/interleukin 1-beta converting	147678	NM_00122	
•		interleukin 2/IL2	147680	X01586	4026-027
		interleukin 3/IL3	147740	Z	5q31.1
		interleukin 4/IL4	147780	NM_00058 9	5q31.1
		interleukin 5/IL5	147850	NM_00087 9	5q31.1
		interleukin 6/IL6	147620	AF048692	7p21
	Synthesis	interleukin 7/1L7	146660	NM_00088 0	8q12-q13
		interleukin 8/IL8	146930	M26383	4q12-q13
		interleukin 9/IL9	146931	X17543	5q31.1
		interleukin 10/IL10	124092	M57627	1q31-q32
		interleukin 11 beta/IL11B	147681	147681 NM_00088	19q13.3-
	_			_	013.4

	interle	interleukin 12A (natural killer cell			
	stimul lymph p35)/I	stimulatory factor 1, cytotoxic lymphocyte maturation factor 1, p35)/IL12A	161560	161560 NM_00218	3p12-q13.2
	interle	interleukin 12B/IL12B	161561	NM_00044 0	5q31.1- q33.1
	interle	interjeukin 13/IL13	147683	NM_00218 8	
	interle	interleukin 15/IL15	600554	U14407	4q31
	interle	interleukin 16/IL16	603035	NM_00451	***
	lympho	Interferent 17 (cytotoxic 1- lymphocyte-associated serine esterase	603149	NM_00219 0	2q31
	interle induci	interleukin 18 (interferon-gamma- inducing factor)/IL.18	600953	NM_00156	11q22.2- q22.3
Interleukins	interle	interleukin 1 receptor, type VIL1R1	147810	147810 NM_00087	2q12
	interle	interleukin 1 receptor, type 2/IL1R2	147811	147811 NM_00463	2q12-q22
	interle	interleukin 1 receptor-like 2/IL1RL2	* * * * *	NM_00385 4	* * * *
	interler protein	interleukin 1 receptor accessory protein/1L1RAP	602626	602626 NM_00218	3928
	B-cell recepto	B-cell antigen CD25/interleukin 2 receptor, alpha chain/IL2RA/CD25	147730	147730 10p15-p14	10p15-p14
	interle	interleukin 2 receptor, beta/IL2RB	146710	146710 NM_00087	22q11.2- q13
	interleukin 2 chain/IL2RG		308380	NM_00020 6	Xq13
	interle	interleukin 3 alpha receptor/IL3RA	308385	M74782	Xp22.3

_			27.000.14	
	interleukin 4 receptor precursor/IL4R	147781	NM_00041 8	16p12.1- p11.2
	interleukin 5 receptor alpha/IL5RA	147851	M96652	3p26-p24:
	interleukin 6 receptor/ILGR	147880	NM_00056 5	1921
Receptors	interleukin 7 receptor/IL7R	146661	NM_00218 5	5p13
	interleukin 9 receptor/IL9R	300007	300007 NM_00218	Xq28
	interleukin 10 receptor, alpha/IL10RA	146933	NM_00155 8	11q23.3
	interleukin 10 receptor beta/IL10RB	* * * * *	NM_00062 8	* * *
	interleukin receptor 11 alpha/IL11RA	686009	NM_00451 2	9p13
	interleukin 12 receptor, beta 1/1L12RB1	600939	NM_00553 5	9p13
-	interleukin 12 receptor, beta 2/IL12RB2	601642	NM_00155 9	1p31.2
	interleukin 13 receptor, alpha 1/IL13RA1	300119	NM_00156 0	Chr.X
	interleukin receptor 13 alpha2/IL13A2	300130	X95302	Xq24
	interleukin 15 receptor, alpha/IL15RA	601070	NM_00218 9	10p15-p14
	interleukin 18 receptor 1/IL18R1	* * * *	NM_00385 5	***
	interleukin 18 receptor accessory protein/IL18RAP	* * * *	NM_00385 3	***
	LPS-Induced TNF-Alpha Factor/LITAF	603795	U77396	16p13.3- p12

	tumor necrosis factor alpha/TNFA	191160	X01394	6p21.3
	tumor necrosis factor		NM_00059	
	beta/TNFB/lymphotoxin alpha/LTA	153440		6p21.3
	tumor necrosis factor		NM_00234	
	C/TNFC/lymphotoxin-beta/LTB	600978	-	6p21.3
	tumor necrosis factor ligand		NM_00332	
	superfamily, member 4/TNFSF4	603594	9	1925
	tumor necrosis factor ligand		NM_00007	
	superfamily, member 5/TNFSF5	308230	4	Xq26
	tumor necrosis factor ligand	134638	NM	1023
	superfamily, member 6/1 NFSF6		6	1
Synthesis	B-cell antigen CD70/tumor necrosis			
	factor ligand superfamily, member		NM_00125	
	7/TNFSF7/CD27 ligand/CD70	602840	2	19p13
	tumor necrosis factor ligand		NM_00124	
	superfamily, member 8/TNFSF8	603875	4	9433
	tumor necrosis factor ligand		NM_00381	
	superfamily, member 10/TNFSF10	603598	0	3q26
	tumor necrosis factor ligand		NM_00370	
	superfamily, member 11/TNFSF11	602642	1	13q14
	tumor necrosis factor ligand		NM_00380	
	superfamily, member 12/TNFSF12	602695	6	17p13.3
	tumor necrosis factor ligand		NM_00657	
	superfamily, member 13B/TNFSF13B	603969	3	13q32-q34
	tumor necrosis factor ligand			
	superfamily, member 15/TNFSF15	604052	****	9433
	tumor necrosis factor receptor	191190	NM_00106	125127
	superfamily, member 1A/TNFRSF1A	2000	5	14013.4
	tumor necrosis factor receptor	191191	NM_00106	1p36.3-
_	superfamily, member 1B/TNFRSF1B		9	p36.2

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Tumor Necrosis Factor Ligand Superfamily

	lymphotoxin beta receptor (TNFR superfamily, member 3/LTBR	626009	NM_00234	12p13
	tumor necrosis factor receptor superfamily, member 4/TNFRSF4	600315	NM_00332	1p36
	B-cell antigen CD40/tumor necrosis factor receptor superfamily, member		NM_00125	20q12-
	5/CD40/TNFRSF5	109535	0	q13.2
	lymphocyte antigen CD95/tumor	2000	NM 00004	
	member 6/TNFRSF6/CD95	134637		10q24.1
	tumor necrosis factor receptor	192509	NM_00382	20-13
	superfamily, member 6B/TNFRSF6B	002201	3	5.1902
	T-cell antigen CD27tumor necrosis			
	factor receptor superfamily, member 7/CD27/TNFRSF7	186711	M63928	12p13
	lymphocyte antigen CD30/tumor			
	necrosis factor receptor superfamily,		NM_00124	
	member 8/CD30/TNFRSF8	153243	3	1p36
Receptors	tumor necrosis factor receptor	602250	NM_00156	1,136
	superfamily, member 9/TNFRSF9	2	1	ocd:
	superfamily, member	603611	NM_00384 4	8p21
	superfamily, member	603612	NM_00384 2	8p22-p21
	superfamily, member	603613	AF014794	8p22-p21
	tulnot hectosis factor receptor superfamily, member	603614	NM_00384 0	8p21
	superfamily, member	603499	NM_00383	18922.1

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		tuliilor licolosis laciul la laciul			
		superfamily, member	602643	NM_00254 6	8q24
		tumor necrosis factor receptor superfamily, member 12/TNFRSF12	603366	NM_00379 0	1p36.3
		tumor necrosis factor receptor superfamily, member 14/TNFRSF14	602746	NM_00382 0	1p36.3- p36.2
		tumor necrosis factor receptor superfamily, member 16/TNFRSF16	162010	NM_00250	17q21-q22
		tumor necrosis factor receptor superfamily, member 17/TNFRSF17	109545	Z14954	16p13.1
		tumor necrosis factor receptor superfamily, member 18/TNFRSF18	603905	****	1p36.3
		transforming growth factor,	190170	190170 NM 003236	2p13
		transforming growth factor, beta-			
		1/TGFB1	190180	M60315	9q13.1-q13.3
	Synthesis	transforming growth factor, beta-			
		2/TGFB2	190220	190220 NM_003238	1941
		transforming growth factor, beta-			
Transformin		3/TGFB3	190230	190230 NM_003239	14924
g Growth		growth differentiation factor 1/GDF1	602880	602880 NM_001492	19p12
Factor		transforming growth factor, beta			
		receptor I (activin A receptor type II-	190181	NM_00461	9433-434
	1	like kinase, 53kD)/TGFBR1		1	
	Receptors	transforming growth factor, beta	100100	NM 00324	
		receptor II (70-30kD)/TGFBR2	190182	2	3p22
		receptor III (betaglycan,	600742	600742 NM_00324	1p33-p32
		200にひびてのでいっこ		٠	

small inducible cytokine subfamily A (Cys-Cys), member 1/ inflammatory cytokine 1309/SCYA1	182281	182281 NM_00298	Chr.17
small inducible cytokine subfamily A (Cys-Cys), member 2/monocyte chemotactic protein 1/MCP1/SCYA2	158105	NM_00298	17q11.2- q12
small inducible cytokine subfamily A (Cys-Cys), member 3/macrophage inflammatory protein 1A/MIP1A/SCYA3	182283	NM_00298 3	17q11-q21
small inducible cytokine subfamily A (Cys-Cys), member 3-like 1/LD78-beta/SCYA3L1	601395	D90144	17q11.2
small inducible cytokine subfamily A (Cys-Cys), member 4/macrophage inflammatory protein 1B/MIP1B/SCYA4	182284	NM_00298	17q21-q23
small inducible cytokine subfamily A (Cys-Cys), member 4-like/macrophage inflammatory protein 1B/MIP1B/SCYA4L	603782	X52149	17q11.2
small inducible cytokine subfamily A (Cys-Cys), member 5/T-cell specific protein p228/TCP228/SCYA5	187011	NM_00298 5	17q11.2- q12
small inducible cytokine subfamily A (Cys-Cys), member 6/SCYA6	* * * *	* * * *	**
small inducible cytokine subfamily A (Cys-Cys), member 7/monocyte chemotactic protein 3/MCP3/SCYA7	158106	AF043338	17q11.2- q12
		*	

Simulations of the cytochild subtaining A			•
(Cys-Cys), member 8/monocyte	602283	NM_00562	17a11.2
chemotactic protein 2/MCP2/SCYA8		m	
small inducible cytokine subfamily A			
(Cys-Cys), member	****	****	****
9/10//SCYA9SCY10			
small inducible cytokine subfamily A		00000 7.51	
(Cys-Cys), member	601156	NIM_00298	1/q21.1-
11/eotaxin/SCYA11		0	d21.2
small inducible cytokine subfamily A	3 3 3	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
(Cys-Cys), member 12/SCYA12	+ + + + + + + + + + + + + + + + + + + +	+ + + + +	K K K K
small inducible cytokine subfamily A		07300 764	
(Cys-Cys), member 13/monocyte	601391	NIM_00540	17q11.2
chemotactic protein 4/MCP4/SCYA13		×	4
small inducible cytokine subfamily A		00160	
(Cys-Cys), member 14/new cc	601392	NM_00459	17q11.2
chemokine 2/NCC2/SCYA14		>	1
small inducible cytokine subfamily A		71700 X EX	
(Cys-Cys), member 15/leukotactin	601393	NIM_00416	17q11.2
1/LKN1/SCYA15		<u> </u>	-
small inducible cytokine subfamily A		00450	
(Cys-Cys), member 16/new cc	601394	601394 NIM _00459	17q11.2
chemokine 4/NCC4/SCYA16		>	•
small inducible cytokine subfamily A			
(Cys-Cys), member 17/thymus and	0.5	NM 00298	,
activation-regulated	075100		16q13
chemokine/TARC/SCYA17	•		

	small inducible cytokine subfamily A (Cys-Cys), member 18/pulmonary and activation-regulated chemokine/PARC/SCYA18	603757	NM_00298 8	17q11.2
	small inducible cytokine subfamily A (Cys-Cys), member 19/macrophage inflammatory protein 3B/MIP3B/SCYA19	602227	602227 NM_00627	9p13
Synthesis (see also signaling and transcription		601960	601960 NM_00459	2q33-q37
factors below)	small inducible cytokine subfamily A (Cys-Cys), member 21/secondary lymphoid tissue chemokine/SLC/exodus 2/SCYA21	602737	602737 NM_00298	9p13
	small inducible cytokine subfamily A (Cys-Cys), member 22/SCYA22	602957	NM_00299 0	16q13
	small, inducible cytokine subfamily A (Cys-Cys), member 23/myeloid progenitor inhibitory factor 1/MPIF1/SCYA23	602494	602494 NM_00506	*
	small inducible cytokine subfamily A (Cys-Cys), member 24/myeloid progenitor inhibitory factor 2/MPIF2/SCY A24	602495	602495 NM_00299	7q11.23
	small inducible cytokine subfamily A (Cys-Cys), member 25/thymus-expressed chemokine/TECK/SCYA25	602565	602565 NM_00562	19p13.2

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Cytokine-Mediated Immune Regulation

small inducible cytokine subfamily A			
(Cys-Cys), member 26/eotaxin 3/SCYA26	* * * * *	AA716120	Chr. 7
small inducible cytokine subfamily A (Cys-Cys), member 27/ALP/SCYA27	**	***	Chr. 9
(Cys-X-Cys), member	155730	NM_00151	4q12-q13
(Cys-X-Cys), member	139110	NM_00208 9	4q12-q13
(Cys-X-Cys), member	139111	AA935273	4q12-q13
small inducible cytokine subfamily B (Cys-X-Cys), member 4/SCYB4/platelet factor 4/PF4	173460	NM_00261	4q12-q13
small inducible cytokine subfamily B (Cys-X-Cys), member 5/epithelialderived neutrophil-activating peptide 78/SCYB5	600324	600324 NM_00299	4q13-q21
	138965	U83303	4q12-q21
	121010	121010 NM_00270	4p12-q13
small inducible cytokine subfamily B (Cys-X-Cys), member 8/SCYB8/interleukin 8/IL8	146930	M26383	4q12-q13
small inducible cytokine subfamily B (Cys-X-Cys), member 9/SCYB9	501704	601704 AA037522	4q21

small inducible cytokine subfamily B			
(Cys-X-Cys), member	147310	147310 NM_00156	4q21
induced protein of 10 kDa/INP10		^	
small inducible cytokine subfamily B (Cvs-X-Cvs), member 11/8CVB11	* * *	AA361853	Chr. 4
small inducible cytokine subfamily B			
(Cys-X-Cys), member			
12/SCYB12/stromal cell-drived	600835	L36033	10q11.1
factor/SDF1			
small inducible cytokine subfamily B	1 1 1	1	
(Cys-X-Cys), member 13/SCYB13	* + + + + +	*	***
small inducible cytokine subfamily B	604186	604186 AC005738	5031
(Cys-X-Cys), member 14/SCYB14		11000011	1 chr
small inducible cytokine subfamily C,	600250	MN	1071 075
member 1/lymphotactin/LTN/SCYC1	00000	5	czb-1zb1
small inducible cytokine subfamily C,	****	NM_00317	4 4 4
member 2/SCYC2		5	*
small inducible cytokine subfamily D			
(Cys-X3-Cys), member	601000	NM 00299	ì
1/fractalkine/neurotactin/NTT/NTN/S	088100	9	169
CYDI			
chemokine (C-C motif) receptor	601150	NM_00129	
1/MIP1A receptor/CCR1	001139	5	3p21
chemokine (C-C motif) receptor	0100	NM 00064	
2/MCP1 receptor/CCR2	001707		3p21
chemokine (C-C motif) receptor	60100	NM 00183	
3/eotaxin receptor/CCR3	007100	7	3p21.3
chemokine (C-C motif) receptor	****	NM_00550	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4/CCR4		∞	+++++

	chemokine (C-C motif) receptor		NM_00057	
	5/CCR5	601373	6	3p21
	chemokine (C-C motif) receptor 6/G		NM 00436	
	protein-coupled receptor 29/GPR29/CCR6	601835		6q27
	chemokine (C-C motif) receptor		20100 7 121	7
	7/epstein-barr virus induced gene 1/EBI1/CCR7	600242	NIM_00183	1/q12- q21.2
	chemokine (C-C motif) receptor	70107	NM 00520	,
C-Motif	8/CCR8	001034	1	3p22
Chemokine	chemokine (C-C motif) receptor		POSOU PER	
Receptors	9/chemokine-binding protein	602648	MINI 00004	3p21.3
	2/CCBP2/CCR9		-1	
	chemokine (C-C motif) receptor 10/CCR10	***	U94888	* * * *
	chemokine (C-X-C motif), receptor			
	3/G protein-coupled receptor	600894	NM_00150	8p12-p11.2
	9/GPR9/CXCR3		4	
	chemokine (C-X-C motif), receptor	162643	NM_00346	10.00
	4/fusin/CXCR4	102043		1 7h7
	chemokine (C-X3-C motif), receptor	601470	KO1470 NM_00133	2nter n71
	1/fractalkine receptor/CX3CR1	0014/0	7	Spiei-p41
	interleukin 8 receptor, alpha/IL8RA	146929	NM_00063	2q35
	interleukin 8 receptor beta/IL8RB	146928	NM_00155	2q35
	chemokine (C motif) XC receptor 1/G		MM 00528	3n71 3.
	protein-coupled receptor 5/GPR5/CCXCR1	600552	3	p21.1
ı				

		factor (glycosylation-inhibiting	153620		22q11.2
		leukemia inhibitory factor/LIF	159540	NM_00230 9	22q12.1- g12.2
		oncostatin M	165095	AF129855	22q12.1- q12.2
		ciliary neurotrophic factor/CNTF	118945	NM_00061 4	11912.2
		epidermal growth factor/EGF	131530	NM_00196	4q25
	Synthesis	pre-B cell stimulating factor homologue/SDF1A	600835	L36034	10q11.1
		cardiotrophin 1	600435	****	***
		mast cell growth factor/MGF	184745	NM_00399 4	12q22
		granulocyte-macrophage colony stimulating factor 2/CSF2	138960	NM_00075 8	5q31.1
		macrophage-specific colony- stimulating factor/CSF1	120420	AH005300	1p21-p13
		granulocyte colony stimulating factor 3/CSF3	138970	NM_00075 9	17q11.2- a12
Other		epidermal growth factor receptor		NM_00522	7
Growth		EGFR	131550	8	p12.1
Factors		ciliary neurotrophic factor receptor/CNTFR	118946	NM_00184 2	9p13
		oncostatin M receptor/OSMR	601743	NM_00399	***
		neutrophil chemotactic response receptor/gp130	162820	* * * *	7q22-qter

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colony stimulating factor 1 receptor/CSFR1
granulocyte-macrophage colony stimulating factor 2 receptor, alpha, low-affinity/CSF2RA
granulocyte-macrophage colony stimulating factor 2 receptor, beta/CSF2RB
granulocyte-macrophage colony stimulating factor 2 receptor, alpha, Y chromasomal/CSF2RY
myelocyte antigen CD105/endoglin/ENG/TGFB receptor 131195 NM_00011 component/CD105
eukocyte antigen CD 97/CD97
signal transducer and activator of transcription 1/STAT 1
signal transducer and activator of transcription 2, 113kD/STAT2
signal transducer and activator of transcription 3/STAT3
signal transducer and activator of transcription 6, interleukin-4 induced/STAT6
(SH3 domain and ITAM motify
STAM-like protein containing SH3 and ITAM domains 2/STAM2

interferon-stimulated transcription factor 3, gamma (48kD)/ISGF3G	147574	NM_00608 4	14q11.2
interferon, alpha-inducible protein 27/IFI27	600009	NM_00553	14q32
interferon, alpha-inducible protein (clone IFI-6-16)/G1P3	147572	NM_00203 8	1p35
Janus kinase 1 (protein tyrosine kinase)/JAK1	147795	NM_00222	1p31.3
Janus kinase 3 (protein tyrosine kinase)/JAK3	600173	NM_00021 5	19p13.1
interleukin-1 receptor-associated kinase M/IRAK-M	***	NM_00719 9	**
interleukin-1 receptor-associated kinase 1/IRAK1	601108	NM_00156 9	Xq28
interleukin-1 receptor-associated kinase 1/IRAK2	603304	NM_00157 0	***
nuclear factor, interleukin 3 regulated/NFIL3	****	NM_00538 4	****
nuclear factor of activated T-cells, cytoplasmic 1/NFATC1	600489	NM_00616 2	18q23
nuclear factor of activated T-cells, cytoplasmic 2/NFATC2	600490	**	20q13.2- q13.3
nuclear factor of activated T-cells, cytoplasmic 3/NFATC3	602698	L41066	16q13-q24
nuclear factor of activated T-cells, cytoplasmic 4/NFATC4	60509	L41067	***
caspase 1, apoptosis-related cysteine protease (interleukin 1, beta, convertase)/CASP1	147678	NM_00122 3	11q22.2- q22.3

TGFB inducible early growth response/TIEG	601878	NM_00565 5	* * * * *
TGFB inducible early growth response 2/TIEG2	603301	NM_00359	* * * * *
eukaryotic translation initiation factor 3, subunit 8 (110kD)/EIF3S8	603911	NM_00375	1p34.1
MAD (mothers against decapentaplegic) homolog 1/MADH1	601595	NM_00590 0	4928
homolog of Xenopus forkhead activin signal transducer-1 /FAST1	603621	NM_00392 3	8q24.3
interleukin 1 receptor accessory protein/IL1RAP	602626	NM_00218 2	3928
CCAAT/enhancer binding protein (C/EBP), delta/CEBPD	189965	NM_00519 5	20q13.1
T-lymphocytes-specific interleukin 2 inhibitor/transcription factor 8/TCF8/	189909	U12170 ·	10p11.2
cAMP responsive element binding protein 1/CREB1	123810	NM_00437 9	2q32.3-q34
interferon-stimulated transcription factor 3, gamma (48kD)/ISGF3G	147574	NM_00608 4	14q11.2
interferon regulatory factor 3/IRF3	603734	NM_00157 1	19q13.3- q13.4
lymphocyte specific interferon regulatory factor/LSIRF/interferon regulatory factor 4/IRF4	601900	U52683	6p25-p23
TNF receptor-associated factor	601711	NM_00565 8	9q33-q34
TNF receptor-associated factor 2/TRAF2	601895	U12597	9934

		TNF receptor-associated factor 3/TRAF3	601896	NM_00330 0	**
		TNF receptor-associated factor 4/TRAF4	602464	NM_00429 5	17q11-q12
	Signaling	TNF receptor-associated factor 5/TRAF5	602356	AB000509	1q32
Cytokine Response	and Transcription	TNF receptor-associated factor 6/TRAF6	602355	NM_00462 0	****
4	n Factors	TRAF family member-associated NFKB activator/TANK	603893	NM_00418 0	2q24-q31
		mitogen activated protein kinase PRKM1/MAPK1	176948	NM_00274 5	22q11.2
		mitogen activated protein kinase PRKM3/MAPK3	601795	X60188	16p11.2
	·	mitogen activated protein kinase PRKM4/MAPK4	176949	NM_00274 7	18q12-q21
		mitogen activated protein kinase PRKM6/MAPK6	602904	NM_00274 8	**
-		mitogen activated protein kinase PRKM7/MAPK7	602521	NM_00274 9	17p11.2
		mitogen activated protein kinase JNK1/PRKM8/MAPK8	601158	L26318	***
		mitogen activated protein kinase NKZ/PRKM9/MAPK9	602896	U09759	5435
		mitogen activated protein kinase JNK3/PRKM10/MAPK10	602897	U35003	***
		mitogen activated protein kinase PŘKM11/MAPK11	602898	AF031135	***
		mitogen activated protein kinase SAPK3/MAPK12	602399	NM_00296	22q13.3

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mitogen activated protein kinase PRKM13/MAPK13	602899	NM_00275	**
mitogen activated protein kinase SAPK2A/MAPK14	600289	NM_00131	6p21.3- p21.2
mitogen-activated protein kinase kinase 1/MAP2K1	176872	NM_00275 5	15q22.1- q22.33
mitogen-activated protein kinase kinase 2/MAP2K2	601263	L11285	* * * * *
mitogen-activated protein kinase kinase 3/MAP2K3	602315	NM_00275 6	17q11.2
mitogen-activated protein kinase kinase 4/MAP2K4	601335	NM_00301 0	17p11.2
mitogen-activated protein kinase kinase 5/MAP2K5	602520	NM_00275	****
mitogen-activated protein kinase kinase 6/MAP2K6	601254	U39065	***
mitogen-activated protein kinase kinase 7/MAP2K7	603014		** **
protein kinase C alpha/PRKCA	176960	NM_00273 7	17q22- q23.2
protein kinase C beta/PRKCB	176970	X06318	16p11.2
protein kinase C, delta/PRKCD	176977	NM_00625 4	3р
protein kinase C gamma/PRKCG	176980	****	19q13.4
protein kinase C, theta/PRKCQ	600448	NM_00625	10p15
protein kinase C, zeta/PRKCZ	176982	NM_00274 4	***
casein kinase 1 alpha 1	600505	NM_00189	13q13

casein kinase 1 gamma 2	602214	089896 U89896	19p13.3
casein kinase 1 delta	600864	NM_00189 3	17925
		NM_00189	
casein Kinase I epsilon	600863	_	22q12-q13
casein kinase 2 alpha 1	115440	J02853	20p13
		MN	16p13.3-
casein kinase 2 alpha 2	115442	9	p13.2
casein kinase 2 beta	115441	X57152	6p21.3
phosphatidylinositol 3-kinase,			
regulatory subunit, polypeptide 1 (p85, 171833 alpha)/PIK3R1	171833	M61906	5q13
phosphatidylinositol 3-kinase,			
regulatory subunit, polypeptide 2 (p85, 603157 NM_00502 beta)/PIK3R2	603157	NM_00502	19q13.2- q13.4
 phosphatidylinositol 3-kinase			
regulatory subunit, polypeptide 3 (p55, *****	****	NM_00362	****
amma)/PIK3R3		6	
phosphoinositide-3-kinase, catalytic,	171834	NM_00621	3000
alpha polypeptide/PIK3CA	1/1034	8	39,20.3
phosphoinositide-3-kinase, catalytic, beta polypeptide/PIK3CB	602925	NM_00621	***
phosphatidylinositol 3-kinase,	00000	NM 00502	
catalytic, delta polypeptide/PIK3CD	602839	9	1p36.2
phosphatidylinositol 3-kinase,		NM 00264	
catalytic, gamma polypeptide/PIK3CG	001737	6	**
peptidyl-prolyl isomerase			
A/cyclophilin A/PPIA	123840	Y00052	7p13
peptidyl-prolyl isomerase			
B/cyclophilin B/PPIB	123841	M60857	chr. 15

	•				
		peptidyl-prolyl isomerase			
	Biosynthesis	Biosynthesis C/cyclophilin C/PPIC	123842	S71018	****
		peptidyl-prolyl isomerase			
		D/cyclophilin D/PPID	601753	601753 NM_005038	4q31.3
		peptidyl-prolyl isomerase			
		E/cyclophilin E/PPIE	***	***** VIM 006112.	****
		peptidyl-prolyl isomerase-like/PPIL1	601301	AF090992	6p21.1
		FK506 binding protein			
		1A/immunophilin/FKBP1A	186945	186945 NM_000801	20p13
		FK506 binding protein			
		2/immunophilin/FKBP2	186946	NM_004470	186946 NM_004470 1913.1-913.3
Cyclophilins	Recentors	FK506 binding protein			
		4/immunophilin/FKBP4	600611	600611 NM_002014	****
		FK506 binding protein			
		5/immunophilin/FKBP5	602623	602623 NM_004117	****
		calcium modulating cyclophilin	01110	NM 00174	
		ligand/CAMLG	601118	۸,	5923
		protein prospitatase 3, cataryne			
		subunit, alpha isoform/calcineurin	114105	M29550	4q21-q24
		pholem for spiratase 3, catarytic			
		subunit, beta isoform/calcineurin	114106	M30773	10q21-q22
		Provent fill spinatase 3, catanyne			
	Response	Subunit, gamma isoform/calcineurin	114107	NM_00560	Chr.8
		protein phosphatase 2, regulatory			
		subunit B, alpha isoform/calcineurin	601302	***	2p16-p15
		calmodulin 1/CALM1	114180	AH005370	14q24-q31
	·	calmodulin 2/CALM2	114182	114182 NM 001743 2p21.3-p21.	2p21.3-p21.1
		calmodulin 3/CALM3	114183	114183 NM_005184 9q13.2-q13.3	9q13.2-q13.3
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			cytochrome P450, subfamily XXI			
			(steroid 21-hydroxylase)/CYP21	201910	M13936	6p21.3
			cytochrome P450, subfamily XIB			
		Riocynthesis				
			polypeptide 2/CYP1/1B2	124080	124080 NM 000498	8q21
-			cytochrome P450, subfamily XIB			
			(steroid 11-beta-hydroxylase),			
Non-			polypeptide 1/CYP11B1	202010	202010 NM_000497	8q21
Cytokine			nuclear receptor subfamily 3, group C,			
Mediated			member 1/NR3C1	138040	138040 NM_000176	5q31
Immune			melanocortin 2 receptor/ACTH			
Regulation			receptor/MC2R	202200	202200 NM_000529	18p11.2
	·		mineralocorticoid			
		·	receptor/MCR/nuclear receptor			
			subfamily 3, group C, member	600983	600983 NM_000901	4q31.1
		Receptors	heat shock 70kD protein 1/HSPA1A	140550	140550 NM_005345	6p21.3
		and	heat shock 70kD protein-like			
		Signaling	1/HSPA1L	140559	140559 NM 005527	6p21.3
			heat shock 70kD protein 1/HSPA1B	603012	603012 NM 005346	6p21.3
			heat shock 90-kD protein 1, alpha			
			subunit/HSPCA	140571	****	1q21.2-q22
	Corticosteroi		heat shock 90-kD protein 1, beta			
	ds		subunit/HSPCB	140572	104988	6p12
			FK506-binding protein 4			
			(59kD)/FKBP4	600611	600611 NM 002014	****
			corticosteroid binding globulin			
			precursor/CBG	122500	122500 NM_001756	14q32.1
			hydroxy-D-5-steroid dehydrogenase, 3			
			b- and steroid D-isomerase 2/HSD3B2 201810 NM 000198	201810	NM 000198	1p13.1

		-				
·			UDP glycosyltransferase 1/UGT1	191740	NM_00107	Chr. 12
			UDP glycosyltransferase family 2, member B4/UGT2B4	600067	NM_00107	4q13
		Metabolism		890009		1914
				603064	NM_00107	****
			UDP glycosyltransferase family 2, member B15/UGT2B15	690009	600069 NM_00107	4q13
			UDP glycosyltransferase family 2, member B17/UGT2B17	601903	NM_00107	1914
			Dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 member 1/SULT2A1	125263	NM_00316	19q13.3
			estrogen-preferring	600043	600043 NM 005420	4q13.1
	Vitamin D	Receptors	vitamin D (1,25- dihydroxyvitamin			
			D3) receptor/VDR	601769	601769 NM_000376	12q12-q14
	Retinoic		Retinoic acid receptor, alpha/RARA	180240	180240 NM_00096	17q12
	Acid	Receptors	Retinoic acid receptor, beta/RARB	180220	180220 NM_00096	3p24
			Retinoic acid receptor, gamma/RARG	180190	M57707	12q13
			T-cell antigen CD4/LEU3/CD4	186940	X87579	12pter-p12
			T-cell antigen CD6/T-cell		NM_00672	
			differentiation antigen/CD6	186720	5	Chr.11
			lymphocyte antigen CD5/LEU1/CD5	153340	X04391	11913
	-				NM_00613	17q25.2-
_			Inymocyte antigen CD7/Tp41/CD7	186820	7	q25.3

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	lymphocyte antigen CD19/B-lymphocyte antigen/CD19	107265	X13312	16p11.2
	B-lymphocyte antigen CD80 (CD28 antigen ligand 1, B7-1 antigen)/CD80	112203	NM_00519 1	3q21
	CD86 antigen (CD28 antigen ligand 2, B7-2 antigen)/CD86	601020	00688 9	3q21
	T-cell antigen CD28 (Tp44)/CD28	186760	NM_00613 9	2q33-q34
	T-cell antigen receptor, beta subunit/TCRB	186930	AF011643	7q35
	CD3G antigen, gamma polypeptide (TiT3 complex)/CD3G	186740	NM_00007	11923
	CD3D antigen, delta polypeptide (TiT3 complex)/CD3D	186790	NM_00073	11923
	CD3E antigen, epsilon polypeptide (TiT3 complex)/CD3E	186830	NM_00073	11923
	CD3Z antigen, zeta polypeptide (TiT3 complex)/CD3Z	186780	NM_00073	1922-923
	TOOLOGY COMMON AND SON	151460	M23492	1q31-q32
	T-cell antigen CD69/p60/CD69	107273	NM_00178	12n13-n12
	lymphoblast antigen CD38/ADP-			
	ribose cyclase/cyclic ADP-ribose		NM_00177	
	hydrolase/CD38	107270	5	4p15
	lymphoblast antigen CD39/vascular		NM_00177	
Receptors	ATP diphosphohydrolase/CD39	601752	9	10q24
	lymphocyte antigen CD73/5' nucleotidase/NT5/ CD73	129190	NM_00252	6014-021
	_	1,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,	17h_L1h0

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Activation,
Differentiati
on, and
Proliferation
(excluding
genes from
cytokine
section
above)

leukocyte antigen CD23/low-affinity receptor II for Fc portion of IgE/FCER2/CD23	151445	NM_00200	19p13.3
macrophage antigen CD 64/high-			
affinity receptor IA for Fc fragment of	- Jo	,	1q21.2-
IgG/FCGR1A	146760	Y10206	q21.3
lymphocye antigen CD57/LEU7/CD57	57 151290	***	Chr.11
lymphocye function-associated		NM_00177	
antigen, type 3/LAF3/LEU7/CD58	153420	6	1p13
lymphocyte antigen CD45/protein			
tyrosine phosphatase, receptor type, c		NM_00283	
polypeptide/PTPRC/CD45	151460	∞	1q31-q32
T-cell antigen receptor, gamma subunit/TCRG	186970	M17325	7p15-p14
1-cell antigen receptor, delta subunit/TCRD	186810	L36384	14q11.2
T-cell antigen CD8, alpha polypeptide (p32)/CD8A	le 186910	NM_00176 8	2p12
T-cell antigen CD8, beta	105770	A 11002050	9
polypeptide/CD8B	100/20	AH003839	7p17
T-cell antigen CD28 (Tp44)/CD28	186760	NM_00613 9	2q33-q34
cytotoxic T-lymphocyte-associated 4/CTLA4	123890	L15006	2q33
T-cell antigen receptor, alpha subunit/TCRA	186880	Z24457	14q11.2
CD89 antigen/receptor for Fc fragment of IgA/FCAR/CD89	nt 147045	NM_00200 0	19q13.4
T-cell activation antigen p250/TP250	186710	***	11pter- p11.2

		signaling lymphocytic activation molecule/SLAM	603492	NM_00303	****
•		T cell receptor-associated protein tyrosine kinase ZAP-70/ZAP70	176947	S69911	2q12
	Signaling	v-mos Moloney murine sarcoma viral oncogene homolog/MOS	190060	NM_00537	8q11
		IL2-inducible T-cell kinase/ITK/T-cell tyrosine kinase EMT/EMT	186973	NM_00554 6	5q32
		mature T-cell proliferation 1/MTCP1	300116	Z24459	Xq28
		lymphocyte-specific protein tyrosine kinase/LCK	153390	NM_00535 6	1p35-p34.3
		B-cell antigen CD20/B-lymphocyte differentiation antigen B1/CD20	112210	AH003353	11q13
		B-cell antigen CD72/CD72	107272	NM_00178 2	99
		macrophage protein 1/NRAMP1/solute carrier family 11,	600266	600266 AH002806	2q35
		natural resistance-associated			
		macrophage protein 2/NRAMP2/solute carrier family 11,	600523	AB015355	12q13
B-Cell Activation,		T-lymphocyte antigen CDW52 (CAMPATH-1 antigen)/CDW52	114280	NM_00180	****
Differentiati on, and	Recentoire	B-cell antigen CD22/CD22	107266	NM_00177	19413.1
Proliferation		Local antigen OD24/CD02	600074	X69397	6q21
(excluding genes from		B-cell antigen CD40/tumor necrosis factor receptor superfamily member		NW 00125	20212
cytokine		5/CD40/TNFRSF5	109535	0	40412- q13.2

	~		8			T	T	Τ.		T -	T	1
	10q26.3	11p15.5	1921-923	3q13.1-	1431	1p21-p13	5q31.1	17q11.2-	5q33.2- q33.3	Yp11	Xp22.32	22q12.2-
	602267 NM_00110	602243 NM_00435	NM_00400	NM_00162	NM_00292 2	AH005300	NM_00075	NM_00075	U63963	**	NM_00614 0	1110373
	602267	602243	146790	601662	600323	120420	138960	138970	164770	425000	306250	138081
	leukocyte antigen CDI 56/disintegrin and metalloprotease domain 8/ADAM8/CDI 56	platelet antigen CD151/platelet- endothelial cell tetraspan antigen 3/PETA3/CD151	IIA for Fc fragment of IgG/FCGR2A/CD32	activated leucocyte cell adhesion molecule/CD6 ligand/ALCAM	regulator of G-protein signaling 1/RGS1	macrophage-specific colony- stimulating factor/CSF1	granulocyte-macrophage colony stimulating factor 2/CSF2	granulocyte colony stimulating factor 3/CSF3	colony stimulating factor 1 receptor/CSFR1	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, Y chromosomal/CSF2RY	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, low-affinity/CSF2RA	granulocyte-macrophage colony stimulating factor 2 recentor
					Signaling		Growth Factors				Receptors	
coction	above)								-	Myeloid Progenitor Cell	Differentiati on and Proliferation	(excluding genes from

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section		CCAAT/enhancer binding protein		NM 00510	
above)		(C/EBP), beta/CEBPB	189965		20q13.1
		CCAAT/enhanccr binding protein (C/EBP), epsilon/CEBPE	600749	NM_00180 5	14q11.2
و المساورة	Signaling	flt3 ligand/FMS-related tyrosine kinase 3 ligand/FLT3LG	600007	U03858	19q13.3
		FMS-related tyrosine kinase 3/FLT3	136351	NM_00411 9	13912
		myeloid differentiation primary response gene (88)/MYD88	602170	NM_00246 8	3p22-p21.3
		BCL2	151430	M13994	18q21.3
		BCL_X/BCLX	600039	Z23115	****
		BCL2 associated protein/BAX	600040	L22473	19q13.3- q13.4
·		BCL2-antagonist/killer 1/BAK1	600516	NM_00118 8	
		BCL2-associated athanogene 1/BAG1 601497		NM_00432 3	
		BCL2-associated athanogene 2/BAG2	603882	NM_00428	****
			603883	AF095193	****
		BCL2-associated athanogene 4/BAG4 603884	603884	AF095194	****
		5	603885	AF095195	****
		BCL-X/BCL-2 binding protein/BAD	603167	AF021792	****
				NM_00119	
		BCL2-like 1/BCL2L1	600039		***
				NM_00405	14q11.2-
		BCL2-like 2/BCL2L2	601931	0	q12
		sis		NM_00653	
		facilitator)/BCL2L11	603827	∞	****

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	_	_	-			,	,									_							
15q24.3	* * * *	17p13.1		10q24.1	4q23-q24	10q24	11q22.2-	q22.3	7q35	4q35, 4q33	q35.1	11922.2-	q22.3	11q22.2-	q22.3		4q25-q25	10q25.1-	q25.2		2q33-q34		****
Y09397 NM_00380	0 U34584	X02469	NM_00004	3	M58603	NM_00250 2		L27475	****	NM 00434	9	NM_00434	7	NM_00434	7	NM_00122	9	NM_00122	7	NM_00122	∞		***
601056	603392	191170		134637	164011	164012		147678	689009		600636		602664		602665		601532		601761		601763		602234
BCL2-related protein A1/BCL2A1 BCL2-interacting protein	Bcl-2 interacting killer/BIK	tumor protein p53/TP53	superfamily, member	O/FAS/INFRSF6	nuclear factor kappa-B DNA binding subunit 1/NFKB1	nuclear factor kappa-B DNA binding subunit 2/NFKB2	apoptosis-related cystein protease	1/caspase 1/CASP1	apoptosis-related cystein protease 1/caspase 1/CASP2	apoptosis-related cystein protease	1/caspase 1/CASP3	apoptosis-related cystein protease	1/caspase 1/CASP4	apoptosis-related cystein protease	1/caspase 1/CASP5	apoptosis-related cystein protease	1/caspase 1/CASP6	apoptosis-related cystein protease	1/caspase 1/CASP7	apoptosis-related cystein protease	1/caspase 1/CASP8	apoptosis-related cystein protease	1/caspase 1/CASP9

Apoptosis (additional genes in Oncology)

2q33-q34	* * * *			1042		10q11.23	16p11.2	16p11.2	11.2	11.2		-q32	.5	q31	*	q32	-q13	2
									16p11.2	16p11.2		2931-932	Chr.5	5923-931	****	2q31-q32	12q11-q13	Chr.2
NM_00123	NM_00372	_	NM_00161		NM 00363	,	NM_00220 9	NM_00063	NM_00088	NM_00535	NM_00221	0	****	NM_00220 3	NM_00550 1	NM_00088 5	NM_00220 5	147556 NM_00021
601762	603653			173870		603501	153370	120980	151510	602453		193210	192968	192974	* * * *	192975	135620	147556
apoptosis-related cystein protease 1/caspase 1/CASP10	apoptosis-related cystein protease 1/caspase 1/CASP13	ADP-ribosyltransferase (NAD+; poly	(ADP-ribose)	polymerase)/PARP/ADPRT	poly (ADP-ribose)	glycohydrolase/PARG	lymphocyte antigen CD11A/integrin, alpha-L/CD11A/ITGAL	lymphocyte antigen CD11B/integrin, alpha-M/CD11B/ITGAM	lymphocyte antigen CD11C/integrin, alpha-X/CD11C/ITGAX	lymphocyte antigen CD11D/integrin, alpha-D/CD11D/ITGAD	antigen CD51/integrin, alpha-	V/vitronectin receptor/CD51/ITGAV	integrin, alpha 1/ITGA1	integrin, alpha 2/1TGA2	integrin, alpha 3/ITGA3	integrin, alpha 4/ITGA4	integrin, alpha5/fibronectin receptor, alpha subunit/FNRA/ITGA5	integrin alpha 6/ITGA6
									Cell- Mediated	Inflammatio n								

: : : : :	integrin, alpha 7/ITGA7	600536	NM_00220 6	12q13
ınıçğı ıns	integrin, alpha 8/ITGA8	604063	L36531	****
	integrin,alpha 9/ITGA9	603963	L24158	3p21.3
	integrin, alpha 10/ITGA10	604042	NM_00363	* * *
	antigen CD29/integrin, beta- 1/CD29/ITGB1	135630	NM_00221	10p11.2
	leukocyte antigen CD18/integrin beta chain, beta 2/CD18/ITGB2	90009	NM_00021 1	21q22.3
	platelet antigen CD61/integrin, beta-3/CD61/ITGB3	173470	NM_00021 2	17q21.32
	integrin, beta 5/ITGB5	147561	NM_00221 3	***
·	integrin, beta 6/ITGB6	147558	8 8 8 8	Chr.2
	integrin, beta 7/ITGB7	147559	6 88000 WN	12q13.13
	integrin, beta-like 1 (with EGF-like repeat domains)/ITGBL1	604234	NM_00479 1	13q33
	erythrocyte antigen CD47/Rh-related antigen, integrin-associated signal transducer/CD47	601028	NM_00177	3q13.1- a13.2
	integrin-linked kinase/ILK	602366	NM_00451	11p15.5- p15.4
	selectin E/endothelial adhesion molecule 1/ELAM1/SELE	131210	NM_00045 0	1q23-q25
Selectins	granulocyte antigen CD62/platelet alpha-granule membrane protein/selectin P/CD62/SELP	173610	NM_00300 5	1923-925

	selectin L/lymphocyte adhesion molecule 1/LAM1/SELL	153240	153240 NM_00065	1923-925
	T-cell antigen CD8, alpha polypeptide (p32)/LEU2/CD8A	186910	MZ	2p12
	T-cell antigen CD8, beta polypeptide/CD8B	186730	AH003859	2p12
	leukocyte antigen CD9/MIC3/CD9	143030	NM_00176 9	12p13
	activated leucocyte cell adhesion molecule/CD6 ligand/ALCAM	601662	NM_00162 7	3q13.1- q13.2
Adhesion	mucosal addressin cell adhesion molecule-1/MACAM1	102670	NM_00716 4	19p13.3
Migration	platelet antigen CD151/platelet-		NM 00435	ľ
	endothelial cell tetraspan antigen 3/PETA3/CD151	602243	7	11p15.5
	CD36/thrombospondin		NM_00007	
	receptor/platelet collagen	173510	2	7q11.2
			NM_00177	19p13-
	leukocyte antigen CD37/CD37	151523	4	q13.4
	platelet antigen CD31/platelet-			
	endothelial cell adhesion molecule		NM_00044	
	1/PECAM1/CD31	173445	2	17q23
	CD26/dipeptidylpeptidase	102720	NM_00193 5	2q23
	lymphocyte antigen CD44/hermes			
	antigen/CD44	107269	AF098641	11pter-p13
S)	B-cell antigen CD 48/B-cell activation		NM_00177	
	marker/BCM1/BLAST1	109530	8	1q21.3-q22
	leukocyte antigen CD53/tetraspan			
	antigen/CD53	151525	AJ243474	1p21-p13.3

	B-cell antigen CD54/intercellular		NM 00020	19p13.3-
	adhesion molecule 1/ICAM1/CD54	147840	-	p13.2
	intercellular adhesion molecule		NM_00087	
	2/ICAM2	146630	3	17q23-q25
	intercellular adhesion molecule		NM_00216	19p13.3-
	3/ICAM3	146631	2	p13.2
			NM_00177	19q13.3-
	myeloid antigen CD33/p67/CD33	159590	2	q13.4
	granulocyte antigen CD66/biliary		NM_00171	
S	glycoprotein/CD66	109770	7	19q13.2
	leukocyte antigen CD81/target of			
	antiproliferative antibody		NM_00435	
	1/TAPA1/CD81	186845	9	11p
	reunocyte antigen		NM 00223	
	CD82/R2/suppression of	600623	-	11p11.2
	ke receptor	008009	NM_00225	12n12 n12
	subfamily B, member 1/KLRB1	00700	8	21d-C1d21
	killer cell lectin-like receptor	333171	NM_00225	12p13.2-
	subfamily C, member 1/KLRC1	101101	6	p12.3
	killer cell lectin-like receptor	100009	NM_00226	12p13.2-
	subfamily C, member 2/KLRC2	002071	0	p12.3
	killer cell lectin-like receptor	008009	NM_00226	12p13.2-
	subfamily C, member 3/KLRC3	00700	1	p12.3
	killer cell lectin-like receptor	208609	NM_00349	12p13.2-
	subfamily C, member 4/KLRC4	00700	7	p12.3
	killer cell antigen CD94/killer cell		9000 MM	12n132.
	lectin-like receptor subfamily D,	602894		n12 3
	member 1/KLRD1/CD94		7	P14
	T-cell antigen CD99/MIC2/CD99	313470	NM_00241	Xpter-
			4	p22.32

Other Adhesion Molecules

_	******	lendente anticon CD100/mil			
		4D/SEMA4D/CD100	601866	NM_00637	9q22-q31
		hematopoietic progenitor cell antigen			
		CD34/CD34	142230	142230 AH000040	1q32
		macrophage antigen		NM 00125	
		CD68/macrosialin/CD68	153634	,	17p13
		cadherin 2, N-cadherin		NM 00179	
		(neuronal)/CDH2	114020	2	18q11.2
		receptor for advanced glycation end			
	***************************************	products/RAGE	600214	AJ133822	6p21.3
		leukocyte antigen		NM 00312	
		CD43/sialophorin/SPN/CD43	182160	ا س ا	16p11.2
		vascular cell adhesion molecule	192225	NM_00107	1
		I/VCAM1	(777(1	∞	1p32-p31
		UDP-Gal:betaGlcNAc beta 1,4-		07.00	
		galactosyltransferase, polypeptide	137060	137060 NM_00149	9p13
		1/B4GALT1		7) ! !
		UDP-Gal:betaGlcNAc beta 1,4-			
		galactosyltransferase, polypeptide	604013	604013 NM_00378	1p33-p32
		2/B4GALT2		>	
		UDP-Gal:betaGlcNAc beta 1,4-		25000 3 50	
		galactosyltransferasc, polypeptide	604014	604014 NIM_003 / /	1923
		3/B4GALT3		о	
Glycosyltran	Glycosyltran	Glycosyltran Glycosyltran UDP-Gal:betaGlcNAc beta 1,4-			
sterases	sferases	galactosyltransferase, polypeptide	604015	604015 AF038662	30133
		4/B4GALT4			
		le 	604016	604016 NM_00477	Chr. 11
				9	

	UDP-Gal:betaGlcNAc beta 1,4-galactosyltransferase, polypeptide 6/B4GALT6	604017	AF038664	18911
	CD15/fucostyltransferase	104230	NM_00203	11921
	monocyte antigen CD87/plasminogen activator receptor, urokinase type/PLAUR/CD87	173391	00265 9	19413
	lymphocyte antigen CD10/membrane metalloendopeptidase/MME/CD10	120520	NM_00090 2	3q21-q27
	leukocyte antigen CD13/alanyl aminopeptdidase/ANPEP/CD13	151530	NM_00115 0	15925-926
	chymase 1, mast cell/CMA1	118938	118938 NM_001836	14q11.2
	tryptase alpha/TPS1	191080	191080 NM_003293	Chr.16
	matrix metalloproteinase l (interstitial collagenase)/MMP1	120353	NM_00242 1	11q22-q23
	matrix metalloproteinase-like 1/MMPL1	****	NM_00414 2	* * *
	matrix metalloproteinase 2 (neutrophil gelatinase)/CLG4/MMP2	120360	AH002654	16q13
	matrix metalloproteinase 3 (stromelysin 1, progelatinase)/MMP3	185250	185250 NM 002422	11923
	matrix metalloproteinase 8 (neutrophil collagenase)/MMP8	120355	120355 NM_002424	=
	matrix metalloproteinase 9 (gelatinase B, 92kD gelatinase, 92kD type IV			
	collagenase)/MMP9	120361	120361 NM_004994 0q11.2-q13.1	20q11.2-q13.1
ļ	matrix metalloproteinase 10			
Proteases	(stromelysin 2)/MMP10	185260	185260 NM_002425 11q22.3-q23	11q22.3-q23

		matrix metalloproteinase 11			
		(stromelysin 3)/MMP11	185261	185261 NM 005940	22q11.2
		matrix metalloproteinase 12			1
Proteases		(macrophage elastase)/MMP12	601046	NM 002426	601046 NM 002426 1922.2-922.3
and		matrix metalloproteinase 13			
Inhibitors		(collagenase 3)/MMP13	600108	600108 NM 002427	11922.3
		matrix metalloproteinase 14		NM 00499	4
		(membrane-inserted)/MMP14	600754	5 م	14911-912
		matrix metalloproteinase 15	1000	NM 00242	
		(membrane-inserted)/MMP15	002201	, ∞	16q13-q21
		matrix metalloproteinase 16	2,000,	NM 00594	
		(membrane-inserted)/MMP16	797709		8q21
		matrix metalloproteinase 17		NM 00414	
		(membrane-inserted)/MMP17	602285		12q24.33
		matrix metalloproteinase 19/MMP19	601807	601807 NM_00242	12q14
		matrix metalloproteinase		Z	
		23A/MMP23A	603320	6	1p36.3
,		matrix metalloproteinase	(0000)	NM 00698	
		23B/MMP23B	003321	, m	1p36.3
		matrix metalloproteinase 24	1 1	69900 MN	
		(membrane-inserted)/MMP24	+++++	, 0	***
		tryptase beta/TPS2	191081	191081 NM 003294	Chr.16
		tissue inhibitor of metalloproteinase			
		1/erythroid potentiating	020300	NM 00325	Xp11.3-
		activity/EPA/human collagenase	0/5000	4	p11.23
		innibitor/HCL/11MP]			
	;	secretory leukocyte protease inhibitor			
	Inhibitors	(antileukoproteinase)/SLPI	107285	107285 NM 003064	***

		-				
			mononcyte/neutrophil elastase			
			inhibitor/ELANH2	130135	M93056	6pter-p24
			alpha-1-microglobulin/bikunin			
			precursor/AMBP	176870	176870 NM 001633	9432-433
			alpha-2-macroglobulin/A2M	103950	103950 NM_000014 2p13.3-p12.	2p13.3-p12
			CD36/thrombospondin		NM 00007	
			receptor/platelet collagen	173510		7q11.2
			CD36 antigen (collagen type I			
			receptor, thrombospondin receptor)-		NM 00550	
	٠		like 1/CD36L1/SRB1	601040		Chr. 12
			CD5 antigen-like (scavenger receptor			
			cysteine rich family)/CD5L	602592	602592 NM 005894	1q21-q23
			acetyl LDL receptor/scavenger			
	•		receptor expressed by endothelial	***	***** NM 003693	***
		·	macrophage scavenger receptor			
			1/MSR1	153622	153622 NM 002445	8p22
		_	macrophage scavenger receptor 1-			
Cell-			like/MSRL1	602728	****	8p21
Mediated	Phagocytosis	Scavenger	mannose receptor, Citype 1/MRC1	153618	153618 NM 002438	10p13
Pathogen	of Pathogens	Recentors	endocytic receptor (macrophage			
Defense	9	s load and	mannose receptor family) (KIAA0709) ***** NM_006039	****	NM_006039	****
			toll-like receptor 1/TLR1	601194	601194 NM_003263	4p14
			toll-like receptor 2/TLR2	603028	603028 NM_003264	4q32
			toll-like receptor 3/TLR3	603029	603029 NM_003265	4935
			toll-like receptor 4/TLR4	603030	603030 NM 003266	9q32-q33
			toll-like receptor 5/TLR5	603031	603031 NM 006068	1941-942
			collectin 34	*****	AB002631	****
			liver collectin 1/CL-L1	****	***** NM 006438	****
			collectin receptor/complement			
			component C1q receptor/C1QR	120577	***	

		surfactant, pulmonary-associated			
		protein D/SFTPD	178635	178635 NM_003019	10q23.3
		surfactant, pulmonary-associated			
·		protein A1/SFTPA1	178630	NM_005411	178630 NM_005411 0922.2-923.1
		immunoglobulin K light chain	147200	****	
		constant region locus/IGKC	14/200		71d7
	Kappa Light	Kappa Light immunoglobulin K light chain variable		1701720	,
	Chain	region locus/IGKV	146980	K01322	2p12
Imminoalob		immunoglobulin K light chain joining	020071	***************************************	,
ulin I jaht		region locus/IGKJ	1409/0	***	71d7
Chains		immunoglobulin L light chain constant	1 47770	NM 00614	011
		region locus/IGLC1	14/220	9	7.11p22
	Lampda	immunoglobulin L light chainjoining	147220	NM_00614	22-11-2
·	Light Chain	Light Chain region locus/IGLJ	14/230	9	7.11p22
		immunoglobulin L light chain variable	147240	NM_00614	222112
		region locus/IGLJ	14/240		7.11.b22
	IgA Heavy	immunoglobulin A heavy chain	146000	****	1 1 00 00
٠.	Chain	constant region locus 1/IGHA1	140900	+ + + + +	14932.33
•	Constant	immunoglobulin A heavy chain	147000	3 3 3 3	
	Region	constant region locus 2/IGHA2	14/000	*	14q32.33
	IgD Heavy				
	Chain	mindolphilia O hoosis			
	Constant	constant region locus/IGHD	147170	***	14q32.33
	Region				
٠	Locus				

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	IgE Heavy Chain Constant Region Locus	immunoglobulin E heavy chain constant region locus/IGHE	147180	**	14q32.33
	loc Heavy	immunoglobulin G heavy chain constant region locus 1/IGHG1	147100	**	14q32.33
	Constant	immunoglobulin G heavy chain constant region locus 2/IGHG2	147110	**	14q32.33
Immunoglob ulin Heavy	Region	immunoglobulin G heavy chain constant region locus 3/IGHG3	147120	***	14q32.33
Chains		immunoglobulin G heavy chain constant region locus 4/IGHG4	147130	***	14q32.33
•	IgM Heavy				
	Chain Constant Region	immunoglobulin M heavy chain constant region locus/IGHM	147020	**	14q32.33
1	Locus				
	Heavy Chain	Heavy Chain immunoglobulin heavy chain variable	020271	00000	14.00.00
	Variable	region locus 1/IGHV1	14/0/0	6/776X	14932.33
	Region Locus	immunoglobulin heavy chain variable region locus 2/IGHV2	600949	***	16p11
	Heavy Chain	Heavy Chain immunoglobulin heavy chain diversity	ــــاك		
	Diversity	region locus 1/IGHDY1	146910	X97051	14q32.33
•	Region Locus	immunoglobulin heavy chain diversity region locus 2/IGHDY2	146990	L25544	15q11-q12
1					

	Heavy Chain				
	Joining	immunoglobulin heavy chain joining	147010	****	14032 33
	Region Locus	region locus/IGHJ			
		recombination activating gene	179615	NM_00044	11p13
		I/KAU1 recomoniation activating gene	179616	8 M94633	11013
		imminoglobulin kanna Tregion			
		recombination signal binding	147183	L07872	9p13-p12
		protein/RBPJK/IGKJRB1			
		Bruton agammaglobulinemia tyrosine kinase/BTK	300300	NM_00006 1	Xq21.3-q22
- 151 (-	Signaling	interleukin 7 receptor/IL/7R	146661	NM_00218 5	5p13
		interferon-gamma receptor 1/IFNGR1	107470	NM_00041 6	6q23-q24
ulin Gene	**	interferon-gamma receptor 2/IFNGR2 147569	147569	NM_00553	21q22.1- q22.2
ent		interleukin 4 receptor precursor/ILAR	147781	NM_00041 8	16p12.1- p11.2
		interleukin 4 receptor precursor/IL4R	147781	NM_00041 8	16p12.1- p11.2
		ligase I, DNA, ATP-dependent/LIG1	126391	NM_00023 4	19q13.2- q13.3
	Docombinoti	ligase IV, DNA, ATP-dependent/LIG4 601837	601837	NM_00231 2	13q22-q34
	on	X-ray repair, complementing defect in Chinese hamster/Ku antigen, 80			
		kD/KU80/XRCC5	194364	***	2q35

		kD/KU70/G22P1	152690	NM_00146	22q11-q13
		nuclear factor kappa-B DNA binding	164011	M58603	4q23-q24
		Subailit 1/11/1 XXD1			
		nuclear factor kappa-B DNA binding subunit 2/NFKB2	164012	NM_00250 2	10q24
		nuclear factor kappa-B subunit 3/NFKB3	164014	Z22949	11q12-q13
		nuclear factor of kappa light chain			
		gene enhancer in B cells, inhibitor	164008	****	14a13
		alpha/NFKBIA			1
		nuclear factor of kappa light chain		02000 3 64	
		gene enhancer in B cells, inhibitor	603258	NM_00250	8011.2
		beta/NFKBIB		m	
		YY 1 transcription factor/YY1	600013	NM_00340	14q
Immunoglob		immunoglobulin transcription factor	1 4711 411	1 1 1	
ulin Gene	Transcriptio	Transcriptio 1/ITF1/transcription factor 3/TCF3	14/141	K K K K K	19p13.3
Transcriptio	n Factors	immunoglobulin transcription factor	01000	NM 00319	
a		2/ITF2/transcription factor 4/TCF4	7/7700	, 6	18q21.1
		immunoglobulin mu binding protein 2/IGHMBP2	600502	NM_00218 0	11q13.2-
		transcription factor binding to IGHM	0.07.0	NM 00652	
		enhancer 3/TFE3	314310	, —	Xp11.22
		homeobox protein OCTI/POU domain	164176	NM 00269	1
		transcription factor 2, class 1/POU2F1	C/1401		1922-923
		homeobox protein OCT2/POU domain	164176	702007	
٠		transcription factor 2, class 2/POU2F2	1041/0	06677M	Chr.19
		POU domain, class 2, associating	700107	NM 00623	
		factor 1/POU2AF1	007100	5 007100	11923.1

		inhibitor of DNA binding 1, dominant	600349	NM_00216	20411
		negati ve helix-loop-helix protein/ID1		5	71602
		inhibitor of DNA binding 2, dominant	20003		
		negative helix-loop-helix protein/ID2	000380	9	5p25
		B-cell antigen CD40/tumor necrosis			
		factor receptor superfamily, member		NM 00125	20g12-
		5/CD40/TNFRSF5	109535	, 0	q13.2
-		paired box gene 5/B-cell lineage-			
		specific activator protein/BSAP/PAX5 167414	167414	***	9p13
		lymphocye function-associated		NM 00177	
		antigen; type 3/LFA3/LEU7/CD58	153420	6	1p13
		interleukin 10 receptor, alpha/IL10RA 146933		NM_00155 8	11q23.3
•		lymphocyte antigen CD45/protein			
		tyrosine phosphatase, receptor type, c		NM 00283	
		polypeptide/PTPRC/CD45	.151460	, ∞	1q31-q32
		prostaglandin E receptor 1, EP1			
		subtype/PTGER1	176802	176802 NIM_000955	19p13.1
		prostaglandin E receptor 2, EP2			
		subtype/PTGER2	176804	****	5p13.1
		prostaglandin E receptor 3, EP3			
	Signaling	subtype/PTGER3	176806	176806 NM 000957	1p31.2
Imminoglob		prostaglandin E receptor 4, EP4			
ulin Isotyne		subtype/PTGER4	601586	601586 NM_000958	5p13.1
Switching		interleukin 13 receptor, alpha	011000	NM 00156	
		1/IL13RA1	500119	0	Chr.X
		interleukin receptor 13 alpha2/IL13A2 300130	300130	X95302	Xq24
		interferon-gamma receptor 1/IFNGR1 107470 NM_00041	107470	NM_00041	6q23-q24

		interferon-gamma receptor 2/IFNGR2 147569	147569	NM_00553	21q22.1- q22.2
		interleukin 5 receptor alpha/IL5RA	147851	M96652	3p26-p24:
Defense		transforming growth factor, beta	100101	NM_00461	
Proteins and		receptor I (activin A receptor type II- like kinase, 53kD)/TGFBR1	190181	2	9455-454
Peptides		transforming growth factor, beta	190182	NM_00324	3p22
		transionning growin factor, beta		NTM 00324	
		receptor III (betaglycan,	600742	3	1p33-p32
		X-ray repair, complementing defect in			
	£				
	Kecombinati		194364	****	2q35
	uo -	thyroid autoantigen, 70		NM_00146	
		kD/KU70/G22P1	152690	6	22q11-q13
		complement component 1, R	216950	NM_00173	12n13
		subcomponent/C1R	210200	3	
		complement component 1, S	120580	NM_00173	12n13
		subcomponent/C1S	12000	4	
		complement component 1, Q			1,1363-
		subcomponent, alpha	120550	***	n34 1
		polypeptide/C1QA			F27::
		complement component 1,	0	4 4 4 4 4 4	1p36.3-
		subcomponent, beta	1205/0	* * * * * *	p34.1
		complement component 1, Q			1n36 3-
		subcomponent, gainina	120575	***	
		polypeptide/C1QG			1:104
		complement component 1, Q	601269	NM_00121	17p13.3
		subcomponent binding protein/C1QBP		2	┙

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	complement component 1 inhibitor (angioedema, hereditary) /C1NH	106100	NM_00006	11q11- q13.1
	complement component 2/C2	217000	NM_00006	6p21.3
	complement component 3/C3	120700	NM_00006 4	19p13.3- p13.2
	complement component 4B/C4B	120820	NM_00059	6p21.3
	complement component 5/C5	120900	NM_00173 5	9q34.1
	complement component 6/C6	217050	NM_00006 5	5p13
	complement component 7/C7	217070	NM_00058	5p13
	complement component 8, alpha polypeptide/C8A	120950	NM_00056 2	1p32
	complement component 8, beta polypeptide/C8B	120960	NM_00006 6	1p32
al xy	complement component 8, gamma polypeptide/C8G	120930	NM_00060 6	9q34.3
	complement component 9/C9	120940	NM_00173	5p13
	complement factor H/H factor 1/HF1	134370	NM_00018 6	1q32
	I factor (complement)/肝	217030	NM_00020 4	4q25
	decay-accelerating factor for complement/DAF/CD55	125240	S72858	1q32
	perforin 1/preforming protein/PRF1	170280	NM_00504 1	10q22

Classical Pathway

Complement

tigen p18- CD59 n CD46/membrane ein/MCP/measels virus t6 ntigen CD55/decay- factor for DAF/CD55 igen p18- CD59 ntigen p18- CD59 NM CABPA component 4-binding 120831 NM CABPB component 5 receptor 1 113995 NM CSAR1 CCAR1 A***** NM CSAR1 CCD21 A**** NM CSAR1 CCD21 A**** NM CSAR1 COD21 A**** NM CSAR1 COD21 A*** NM CSAR1 CSAR1 COD21 A**** NM CSAR1 CSAR1 COD21 A**** NM CSAR1 COD31 NM COD31 NM	-					
T-cell antigen CD46/membrane cofactor protein/MCP/measels virus receptor/CD46 erythrocyte antigen CD55/decay- accelerating factor for complement/DAF/CD55 leukocyte antigen p18- 20/protectin/CD59 erythrocyte antigen p18- 20/protectin/CD59 complement CB1 (receptor for complement component 3a receptor 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 5 receptor 1 113995 complement component 5 receptor 1 113995 antigen CD21/CD21 erythrocyte antigen CD21/CD21 seately a receptor 1 113995 antigen CD21/CD21 seately protein, beta/C4BPB complement component 5 receptor 1 113995 antigen CD21/CD21 seately protein beta/C4BPB antigen CD21/CD21 seately protein P factor, complement/PFC 312060 adipsin/complement factor D 134350			leukocyte antigen p18- 20/protectin/CD59	107271	M95708	11p13
cofactor protein/MCP/measels virus receptor/CD46 erythrocyte antigen CD55/decay- accelerating factor for complement/DAF/CD55 125240 leukocyte antigen p18- 20/protectin/CD59 107271 erythrocyte antigen CD35/complement receptor CR1 (receptor for components C3b/C4b)/CD35/CR1 complement component 3a receptor 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 5 receptor 1 113995 complement component 5 receptor 1 113995 antigen CD21/CD21 antigen CD21/CD21 s****** B-factor, properdin/BF properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			T-cell antigen CD46/membrane			
receptor/CD46 erythrocyte antigen CD55/decay- accelerating factor for complement/DAF/CD55 leukocyte antigen p18- 20/protectin/CD59 erythrocyte antigen CD35/complement receptor CR1 (receptor for components C3b/C4b)/CD35/CR1 complement component 3a receptor 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 5 receptor 1 113995 C5a ligand)/C5AR1 antigen CD21/CD21 s***** B-factor, properdin/BF properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			cofactor protein/MCP/measels virus			
erythrocyte antigen CD55/decay- accelerating factor for complement/DAF/CD55 leukocyte antigen p18- 20/protectin/CD59 erythrocyte antigen CD35/complement receptor CR1 (receptor for components C3b/C4b)/CD35/CR1 complement component 3a receptor 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 5 receptor 1 120831 protein, beta/C4BPB complement component 5 receptor 1 13395 CSa ligand)/C5AR1 antigen CD21/CD21 8-factor, properdin/BF properdin P factor, complement/PFC 13350 adipsin/complement factor D 134350			receptor/CD46	120920	Y07713	1q32
accelerating factor for complement/DAF/CD55 leukocyte antigen p18- 20/protectin/CD59 erythrocyte antigen CD35/complement receptor CR1 (receptor for components C3b/C4b)/CD35/CR1 complement component 3a receptor 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 5 receptor 1 complement component 5 receptor 1 CSa ligand)/C5AR1 antigen CD21/CD21 8***** B-factor, properdin/BF properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			erythrocyte antigen CD55/decay-			
complement/DAF/CD55 leukocyte antigen p18- 20/protectin/CD59 erythrocyte antigen CD35/complement receptor CR1 (receptor for components C3b/C4b)/CD35/CR1 complement component 3a receptor 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 4-binding protein, beta/C4BPB complement component 5 receptor 1 CSa ligand)/C5AR1 antigen CD21/CD21 B-factor, properdin/BF properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			accelerating factor for	***		
leukocyte antigen p18- 20/protectin/CD59 20/protectin/CD59 107271 erythrocyte antigen CD35/complement receptor CR1 (receptor for components C3b/C4b)/CD35/CR1 complement component 3a receptor 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 4-binding protein, beta/C4BPB complement component 5 receptor 1 113995 (C5a ligand)/C5AR1 antigen CD21/CD21 8-factor, properdin/BF Properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			complement/DAF/CD55	125240	S72858	1q32
erythrocyte antigen CD35/complement receptor CR1 (receptor for 120620 components C3b/C4b)/CD35/CR1 complement component 3a receptor 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 4-binding protein, beta/C4BPB complement component 5 receptor 1 (C5a ligand)/C5AR1 antigen CD21/CD21 ****** B-factor, properdin/BF 138470 properdin P factor, complement factor D 134350	V.		leukocyte antigen p18-			
erythrocyte antigen CD35/complement receptor CR1 (receptor for components C3b/C4b)/CD35/CR1 components C3b/C4b)/CD35/CR1 ****** 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 4-binding protein, beta/C4BPB complement component 5 receptor 1 113995 (C5a ligand)/C5AR1 antigen CD21/CD21 ****** B-factor, properdin/BF 138470 properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			20/protectin/CD59	107271	M95708	11p13
receptor CR1 (receptor for components C3b/C4b)/CD35/CR1 complement component 3a receptor ****** 1/C3AR1 complement component 4-binding 120830 protein, alpha/C4BPA complement component 4-binding 120831 protein, beta/C4BPB complement component 5 receptor 1 (C5a ligand)/C5AR1 antigen CD21/CD21 B-factor, properdin/BF properdin P factor, complement/PFC 312060 adipsin/complement factor D			erythrocyte antigen CD35/complement			
components C3b/C4b)/CD35/CR1 complement component 3a receptor 1/C3AR1 complement component 4-binding protein, alpha/C4BPA complement component 4-binding protein, beta/C4BPB complement component 5 receptor 1 C5a ligand)/C5AR1 antigen CD21/CD21 B-factor, properdin/BF properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			receptor CR1 (receptor for	120620		1932
complement component 3a receptor ****** 1/C3AR1 complement component 4-binding 120830 protein, alpha/C4BPA complement component 4-binding 120831 protein, beta/C4BPB complement component 5 receptor 1 (C5a ligand)/C5AR1 antigen CD21/CD21 B-factor, properdin/BF properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			components C3b/C4b)/CD35/CR1			•
complement component 4-binding 120830 protein, alpha/C4BPA complement component 4-binding 120831 protein, beta/C4BPB complement component 5 receptor 1 113995 (C5a ligand)/C5AR1 antigen CD21/CD21 ****** B-factor, properdin/BF 138470 properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350	· · · · ·		complement component 3a receptor 1/C3AR1	* * * *	NM_00405 4	***
complement component 4-binding 120831 protein, beta/C4BPB complement component 5 receptor 1 113995 antigen CD21/CD21 ***** B-factor, properdin/BF 138470 properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			complement component 4-binding protein, alpha/C4BPA	120830	NM_00071 5	1432
complement component 5 receptor 1 113995 (C5a ligand)/C5AR1. ***** antigen CD21/CD21 ***** B-factor, properdin/BF 138470 properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350	; .		complement component 4-binding protein, beta/C4BPB	120831	NM_00071 6	1432
antigen CD21/CD21 B-factor, properdin/BF properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			complement component 5 receptor 1 (C5a ligand)/C5AR1	113995	NM_00173 6	Chr.19
B-factor, properdin/BF 138470 properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350	į		antigen CD21/CD21	****	X98257	***
properdin P factor, complement/PFC 312060 adipsin/complement factor D 134350			B-factor, properdin/BF	138470	NM_00171 0	6p21.3
lement factor D	Alt	ernative athway	properdin P factor, complement/PFC	312060	NM_00262 1	Xp11.4- p11.23
			adipsin/complement factor D precursor/DF	134350	NM_00192 8	* * * *

		defensin, alpha 1, myeloid-related	175770	NM_00408	8p23.2-
		sequence/DEFA1	123220		
		defensin, alpha 3, neutrophil-specific/DEFA3	* * * * * * * * * * * * * * * * * * * *	NM_00521	^
		defensin, alpha 4/corticostatin/DEFA4	601157	NM_00192 5	Chr.8
		defensin, alpha 5/DEFA5	600472	M97925	8pter-p21
		defensin, alpha 6, Paneth cell- specific/DEFA6	600471	NM_00192 6	8pter-p21
		defensin, beta 1/DEFB1	602056	NM	8p23.2- p23.1
		defensin, beta 2/DEFB2	602215	NM_00494 2	8p23.1-p22
•		ribonuclease, RNase A family, 2/eosinophil-derived neurotoxir/EDN/RNASE2	131410	131410 NM_00293	14q24-q31
•		ribonuclease, RNase A. family, 3/ecsinoplii cationid protein/ECP/RNASE3	31398	NM_00293	14q24-q31
		myeloperoxidase/MPO	254600	102694	17q23.1
		eosinophil peroxidase/EPX	131399	NM_00050 2	
	Defensins and Related	cathelicidin antimicrobial peptide/CAMP	600474	NM_00434 5	3p21.3
	Protective Proteins	lysozynie/LYZ	153450	153450 NM_00023	Chr.12
Acute		chitinase 1/CHIT1	600031	NM_00346 5	1q31-q32
Protection		lactotransferrin/LTF	150210	150210 NM_00234	3q21-q23

	Pathogens		polyadenylate binding protein/TIA1	603518	M77142	2p13
	0		TIA1 cytotoxic granule-associated RNA-binding protein-like 1/TIAL1	603413	NM_00325 2	10q
			granulysin/NKG5	603082	NM_00643 3	2p12-q11
			neutrophil azurocidin/NAZC	162815	M96326	19p13.3
			bactericidal/permeability-increasing protein precursor/BPI	109195	NM_00172 5	20q11.23- q12
·			lipopolysaccharide-binding protein/LBP	151990	AF105067	20q11.23- q12
			monocyte antigen CD14/monocyte differentiation antigen/CD14	158120	NM_00059 1	5q31.1
			proteoglycan 1, secretory granule/serglycin/PRG1	177040	NM_00272 7	10q22.1
			proteoglycan 2, bone marrow/natural killer cell activator, eosinophil granule major basic protein/PRG2	*	NM_00272 8	**
			prepro-major basic protein homolog/MBPH	***	NM_00609	***
			neuronal pentraxin INPTX1	602367	NM_00252 2	17q25.1- q25.2
			neuronal pentraxin II/NPTX2	05/009	U26662	7q21.3- q22.1
		Pentraxins	pentaxin-related gene, rapidly induced by IL-1 beta/PTX3	602492	NM_00285 2	3q25
			aniyloid P component, serum/APCS	104770	NM_00163	1921-923
			C-reactive protein, pentraxin-related/CRP	123260	X56214	1q21-q23
·			Aczfo1	•	•	

<u> </u>		mast cell IgE receptor alpha polypeptide/FCER1A	147140	****	1923
		mast cell IgE receptor beta polypeptide/FCER1B	147138	147138 NM_00013	11913
		mast cell IgE receptor beta polypeptide/FCER1G	147139	NM_00410 6	1923
		granulocyte antigen CD62/platelet			
		alpha-granule membrane protein/selectin P/CD62/SELP	173610	NM_00300 5	1q23-q25
		neutrophil antigen CD16/low-affinity			
	Receptors		146740	M24853	1923
		IgG/FCGR3A/CD16			•
Degranulatio		prostaglandin I2			
Jo u		receptor/PTGIR/prostacyclin receptor	600022	600022 SEG_HUMIR	19q13.3
Platelets, Mast Cells,		formyl peptide receptor 1/FPR1	136537	136537 NM_00202	Chr.19
Neutrophils, and		formyl peptide receptor-like 1/FPRL1	136538	Ž	19q13.3- q13.4
Eosinophils		formyl peptide receptor-like 2/FPRL2	136539	NM_00203	-
		linovin Ad recentor	****	0 AE064012	413.4
		inpoxiii za receptoi		AFU34013	******
		inositol polyphosphate-5-phosphatase, 145 kD/SH2-containing inositol 5-	601582	601582 NM_00554	2q36-q37
		phosphatase/SHIP/INPP5D		-1	•
		v-yes-1 Yamaguchi sarcoma viral	165100	NM 00235	
	Signaling	related oncogene homolog/LYN	1021201	0	8q13-qter
		guanine nucleotide binding protein (G protein), q polypeptide/GNAO	866009	NM_00207	9421
	•				

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		guanine nucleotide binding protein (G			
		protein), alpha inhibiting activity,	139360	10700 TAINI	3p21
		polypeptide 2/GNAI2		0	•
		phospholipase A2 group	172411	172411 NM_000300	1p35
		phospholipase A2 group IB/PLA2G1B		172410 NM 000928 12q23-q24.	12q23-q24.1
		phospholipase A2 group X/PLA2G10 603603 NM_003561 16p13.1-p12	603603	NM_003561	16p13.1-p12
		phospholipase A2 group			
		IVA/PLA2G4A	600522	U08374	1925
		phospholipase A2 group VI/PLA2G6	603604	AF064594	22q13.1
		phospholipase A2 group			
		IVC/PLA2G4C	603602	603602 NM_003706	chr. 19
	Dhoenholinge	Phospholipase A2 group V/PLA2G5	601192	601192 NM_000929	1p36-p34
	r nospnoupas	phospholipase C, beta 2/PLCB2	604114	604114 NM_004573	15q15
	3	phospholipase C, beta 3/PLCB3	600230	U26425	11q13
e e		phospholipase C, beta 4/PLCB4	600810	600810 NM_000933	20p12
Kelease of		phospholipase C, delta 1/PLCD1	602142	602142 NM_006225	3p22-p21.3
Memorane Tinida		phospholipase C, epsilon/PLCE	265009	600597 NM_006226	2q33
Lipius		phospholipase C, gamma 1 (formerly			
COMMON 10		subtype 148)/PLCG1	172420	172420 NM_002660 20q12-q13.1	20q12-q13.1
rar, upoxin, Igubotrigno		phospholipase C, gamma 2			
seavousene,		(phosphalidylinositol-specific)/PLCG2 600220 NM_002661	600220	NM_002661	16q24.1
nrostaolandi	•	lysosomal acid lipase/LIPB	278000	278000 NM_000235	10q24-q25
n pathways)		lipocortin 1/annexin 1/ANXA1	151690	V00546	9q11-q22
		lipocortin 2/annexin 2/ANXA2	151740	D00017	15q21-q22
		lipocortin 3/annexin 3/ANXA3	106490	M20560	4q21
	Annexins	lipocortin 5/annexin 5/ANXA4	131230	NM_00115	4q26-q28
		lipocortin 7/annexin 7/ANXA1	186360	186360 NM_00403	10q21.1- q21.2

		arachidonate 12-lipoxygenase, 12R	602741	NM_00113	17pter-
	Arachidonat	Arachidonat type/ALOX12B	14/500		p13.1
	Ai aciliuoliat	arachidonate 15-	00000	NM 00114	
	Metaholism	lipoxygenasc/ALOX15	127397	, 0	17p13.3
		arachidonate 15-lipoxygenase, second	603697	NM_00114	****
		prostaglandin endoperoxide synthetase		7	
		I/COX1/PTGS1	176805	AH001520	9a32-a33.3
		prostaglandin endoperoxide synthetase			_
		2/COX2/PTGS2	600262	NM_000963	600262 NIM_000963 1925.2-925.3
		thromboxane A synthase 1/TBXAS1	274180	274180 EG_D34613	7q34
	Biosynthesis	prostaglandin D2 synthase			
		(hematopoietic)	602598	****	****
		prostaglandin D2 synthase (21kD,			
		brain)/PTGDS	176803	M61900	****
	e or Una	prostagiandin I2 synthase/prostacyclin			
	•.	synthase/PTGIS	601699	601699 EG_D83393	20q13
		prostaglandin E receptor 1, EP1			
		subtype/PTGER1	176802	176802 NM 000955	19p13.1
		prostaglandin E receptor 2, EP2	,		
Prostaglandi		subtype/PTGER2	176804	****	5p13.1
ns		prostaglandin E receptor 3, EP3			
		subtype/PTGER3	176806	176806 NM 000957	1p31.2
		prostaglandin E receptor 4, EP4			
	Receptors	subtype/PTGER4	601586	601586 NM 000958	5p13.1
		prostaglandin F receptor/PTGFR	600563	L24470	1p31.1
		prostaglandin F2 receptor negative			
		regulator/PTGFRN	601204	U26664	1p13.1-q21.3

		prostaglandin I2	_		
		recentor/DTGTB/urostaginalia recenter	_	her min cm	
		receptor/r i Oil prostacyciin receptor	_	DOUUZZ SEG HUMIN	19q13.3
		solute carrier ramily 21 (prostaglandin			
,		transporter), member 2/SLC21A2	601460	601460 NM_005630	3q21
		l 5-hydroxyprostaglandin			
,	Catabolism		601688	601688 NM_000860	4q34-q35
		aldo-keto reductase family 1, member			
		C2/AKR1C2	600450	600450 NM_001353	10p.15-p14
Com	Biosynthesis	CDP-choline:alkylacetylglycerol cholinephosphotransferase	* * * *	***	****
	.•	platelet activating factor	173303	2000	
Molecule	Receptors	receptor/PTAFR	1/3393	M881//	1p35-p34.3
Mediatore of		platelet activating factor	007107	NM 00508	
Inflammatio Platelet	•	acetylhydrolase i/PAFAH1	060100	4	op21.2-p12
Y A	. •	acetylhydrolase, isoform 1B, alpha	601545	NM_00043	17p13.3
	Catabolism	plateiet activating factor	802508	NM_00257	11,000
		marris A VAIIVA	005200	1	11423
		acetylhydrolase, isoform 1B, gamma	603074	NM_00257	19q13.1
		platelet activating factor acetylhydrolase 2/PAFAH2	602344	602344 NM_00043	**
		arachidonate 5-lipoxygenase/ALOX5	152390	69000 MN	Chr.10
		arachidonate 5-lipoxygenase- activating protein/FLAP/ALOX5AP	603700	603700 NM_00162	13q12
	Biosynthesis	arachidonate 12-lipoxygenase, 12R Biosynthesis type/ALOX12B	603741	NM_00113	17pter- p13.1

Lipoxins		Gamma-glutamyltranspeptidase	231950	J04131	22q11.1- q11.2
		Guinna Blurannyin anspeptitusse	137181	AH002728	22q11.1
		Gamma-glutamyltransferase-like activity 1/GGTLA1	137168	NM_00412 1	* * * * *
	Receptors	lipoxin A4 receptor	****	AF054013	****
	Catabolism	renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
		arachidonate 5-lipoxygenase/ALOX5	152390	8 69000 [™] NN	Chr.10
		arachidonate 5-lipoxygenase- activating protein/FLAP/ALOX5AP	603700	NM_00162 9	13q12
	í	leukotriene A4 hydrolase/LTA4H (aminopeptidase)	151570	NM_00089 5	12922
	Synthesis	leukotriene C4 synthase/LTC4S	246530	NM_00089	5435
Leukotrienes		Gamma-glutamyltranspeptidase 1/GGT1	231950	J04131	22q11.1- q11.2
		ominia Blutanijinanspopudase	137181	AH002728	22q11.1
		Gamma-glutamyltransferase-like activity 1/GGTLA1	137168	NM_00412 1	***
	Recentors	cysteinyl leukotriene receptor 1/CYSLT1	300201	NM_00663 9	Xq13-q21
. "		leukotriene b4 receptor (chemokine receptor-like 1)/LTB4R	601531	NM_00075 2	14q11.2- q12
	Catabolism	Catabolism renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
	Biosynthesis	Biosynthesis Histidine Decarboxylase	142704	M60445	15q21-q22

ceptor/HRH2 ceptor/HRH3 ethyltransferase (copper-containing) (copper-containing) ino Acid AADC oxylase/TPH STA ZETA SETA SIGMA receptors 5-HT1B, G			histamine H1 receptor/HRH1	600167	NM_00086 1	3p21-p14
Histamine H3 receptor/HRH3 Histamine N-methyltransferase Amine oxidase (copper-containing) 2/AOC2 Amine oxidase (copper-containing) 3/AOC3 aromatic L-Amino Acid Decarboxylase/AADC tryptophan hydroxylase/TPH 14-3-3 protein ETA 14-3-3 protein ETA 14-3-3 protein SETA 14-3-3 protein SIGMA serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1E, G		Receptors	histamine H2 receptor/HRH2	142703	AB023486	***
Histamine N-methyltransferase Amine oxidase (copper-containing) 602268 Amine oxidase (copper-containing) 603735 It-3-3 protein ETA 191060 Serotonin 5-H7 receptors 5-H71A, G protein-coupled 601280 protein-coupled 182131 serotonin 5-H7 receptors 5-H71C, G protein-coupled 182133 Receptors 5-H71B, G protein-coupled 182133 serotonin 5-H7 receptors 5-H71B, G protein-coupled 182133 serotonin 5-H7 receptors 5-H71B, G protein-coupled 182132 serotonin 5-H7 receptors 5-H71B, G protein-coupled 182132 serotonin 5-H7 receptors 5-H71B, G protein-coupled 182132	Histamine		histamine H3 receptor/HRH3	* * * *	***** NM_00723	* * *
Amine oxidase (copper-containing) 602268 Amine oxidase (copper-containing) 603735 3/AOC3 aromatic L-Amino Acid Decarboxylase/AADC tryptophan hydroxylase/TPH 191060 tryptophan hydroxylase/TPH 191060 14-3-3 protein ETA 113508 14-3-3 protein ETA 601289 14-3-3 protein BETA 601289 14-3-3 protein SIGMA 601289 protein-coupled 601290 serotonin 5-HT receptors 5-HT1B, G protein-coupled 182131 serotonin 5-HT receptors 5-HT1B, G protein-coupled 182133 serotonin 5-HT receptors 5-HT1B, G protein-coupled 182133 serotonin 5-HT receptors 5-HT1B, G protein-coupled 182132 serotonin 5-HT receptors 5-HT1F, G protein-coupled 182132			Histamine N-methyltransferase	****	D16224	chr. 2
Amine oxidase (copper-containing) 3/AOC3 aromatic L-Amino Acid Decarboxylase/AADC 107930 tryptophan hydroxylase/TPH 191060 14-3-3 protein ETA 14-3-3 protein ETA 14-3-3 protein BETA 14-3-3 protein SIGMA serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1B, G serotonin 5-HT receptors 5-HT1E, G protein-coupled		Catabolism	Amine oxidase (copper-containing) 2/AOC2	602268	D88213	17921
aromatic L-Amino Acid Decarboxylase/AADC tryptophan hydroxylase/TPH Synthesis 14-3-3 protein ETA 14-3-3 protein ETA 14-3-3 protein BETA 14-3-3 protein BETA 14-3-3 protein SIGMA serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			Amine oxidase (copper-containing) 3/AOC3	603735	AF054985	17921
Synthesis 14-3-3 protein ETA 14-3-3 protein ETA 14-3-3 protein ZETA 14-3-3 protein ZETA 14-3-3 protein BETA 14-3-3 protein SIGMA serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			aromatic L-Amino Acid			,
Synthesis 14-3-3 protein ETA 14-3-3 protein ETA 14-3-3 protein ZETA 14-3-3 protein BETA 14-3-3 protein BETA 14-3-3 protein BETA 14-3-6 protein SIGMA serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			Decarboxylase/AADC	107930	M76180	7p11
Synthesis 14-3-3 protein ETA 14-3-3 protein ZETA 14-3-3 protein BETA 14-3-3 protein BETA 14-3-3 protein SIGMA serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			tryptophan hydroxylase/TPH	191060	X52836	11p15.3-p14
14-3-3 protein ZETA 14-3-3 protein BETA 14-3-3 protein SIGMA serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled	·	Synthesis	14-3-3 protein ETA	113508	X78138	22q12
14-3-3 protein BETA 14-3-3 protein SIGMA serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			14-3-3 protein ZETA	601288	M86400	2p25.2-p25.1
serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			14-3-3 protein BETA	601289	X57346	20q13.1
serotonin 5-HT receptors 5-HT1A, G protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			14-3-3 protein SIGMA	601290	X57348	****
protein-coupled serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			serotonin 5-HT receptors 5-HT1A, G			
serotonin 5-HT receptors 5-HT1B, G protein-coupled serotonin 5-HT receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			protein-coupled	109760	X57829	5q11.2-q13
Receptors Receptors Protein-coupled Serotonin 5-HT receptors 5-HT1C, G protein-coupled Serotonin 5-HT receptors 5-HT1B, G protein-coupled Serotonin 5-HT receptors 5-HT1E, G protein-coupled Serotonin 5-HT receptors 5-HT1E, G protein-coupled		•	serotonin 5-HT receptors 5-HT1B, G			
Receptors 5-HT1C, G protein-coupled serotonin 5-HT receptors 5-HT1D, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1E, G protein-coupled			protein-coupled	182131	M81590	6q13
Receptors Receptors Protein-coupled Serotonin 5-HT receptors 5-HT1D, G protein-coupled Serotonin 5-HT receptors 5-HT1E, G protein-coupled Serotonin 5-HT receptors 5-HT1F, G protein-coupled			serotonin 5-HT receptors 5-HT1C, G			
Receptors Receptors Protein-coupled Serotonin 5-HT receptors 5-HT1E, G protein-coupled Serotonin 5-HT receptors 5-HT1E, G Serotonin 5-HT receptors 5-HT1E, G protein-coupled		٠	protein-coupled	312861	U49516	Xq24
Receptors serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1F, G protein-coupled protein-coupled		•	serotonin 5-HT receptors 5-HT1D, G			
Receptors serotonin 5-HT receptors 5-HT1E, G protein-coupled serotonin 5-HT receptors 5-HT1F, G protein-coupled	Corotonin	•	protein-coupled	182133	M81590	1p36.3-p34.3
protein-coupled serotonin 5-HT receptors 5-HT1F, G protein-coupled		Pacentors	serotonin 5-HT receptors 5-HT1E, G			
receptors 5-HT1F, G		s ioidanax	protein-coupled	182132	M91467	6914-915
			serotonin 5-HT receptors 5-HT1F, G			
			protein-coupled	182134	L05597	3p12

		_				
			serotonin 5-HT receptors 5-HT2A, G			
			protein-coupled	182135	D87030	13q14-q21
	-		serotonin 5-HT receptors 5-HT2B, G			
		No.	protein-coupled	601122	X77307	2936.3-937.1
			serotonin 5-HT receptors 5-HT2C, G			
			protein-coupled	312861	U49516	Xq24
		Uptake	serotonin transporter	182138	X70697	17q11.1-q12
			monoamine oxidase A/ MAOA	309850	M69226	Xp11.23
		Catabolism	monoamine oxidase B MAOB	309860	M69177	Xp11.23
			serotonin N-Acetyltransferase/SNAT	600950	U40347	17925
			tryptophan 2,3-dioxygenase/TDO2	191070	191070 NM_005651	4q31-q32
			nitric oxide synthetase 1/NOS1	163731	AH001515	12q24.2- q24.31
			nitric oxide synthetase 2A/NOS2A	163730	X85766	17cen-q11.2
			macrophage nitric oxide synthetase 2B/NOS2B	600719	AH006623	17p13.1- a25
	Nitric Oxide Pathway	Synthesis	macrophage nitric oxide synthetase 2C/NOS2C	600720	600720	17p13.1-
			nitric oxide synthetase 3/NOS3	163729	AH001515	7936
			chondrocyte nitric oxide synthetase 3/NOS4	163728	X73029	***
			arginase/ARG1	207800	NM_00004 5	**
			arginase/ARG2	107830	NM_00117	14q24.1-
					2	q24.3
			endothelin 1/EDN1	131240	131240 NM_001955	6p24-p23
		Synthesis	endothelin 2/EDN2	131241	131241 NM 001956	1p34
-			endothelin 3/EDN3	131242 N	131242 NM 00011400q13.2-q13.	0q13.2-q13.3

	Endothelin		endothelin converting enzyme 1/ECE1		600423 NM_001397	1p36.1
			endothelin A receptor isoform delta			
		Receptor	3/EDNRA	131243	AF014826	Chr.4
Vascularizati			endothelin receptor type B/EDNRB	131244	131244 NM_000115	13q22
uo			vascular endothelial growth factor			
	W.7		AVEGFA	192240	M32977	6p.12
	v ascular Fractholiel	Crmthodic	vascular endothelial growth factor			
	Crountellar	Synthesis	B/VEGFB	601398	U52819	11913
	Factor		vascular endothelial growth factor			
			CVEGFC	601528	X94216	***
		Receptor	VEGF receptor	191306	X61656	.4q12
			dopamine beta hydroxylase/DBH	223360	96000A	9934
		Cymthosic	phenylethanolamine-N-	11100	NM 00268	
	,	Synthesis	methyltransferase/PNMT	0611/1	9.	1/q21-q22
			tyrosine hydroxylase/TH	191290	X05290	11p15.5
			aiplia 1a au cheigle	104219	M76446	Chr.20
			arpria 10-autolicigio	104220	L31773	5633
			alpha-10-aulcheigle	104221	D25235	8p21
			aipiia-1u-auloileigio	104222	M76446	20p13
			aipiia za aui ciici gic	104210	M18415	10q24-q26
			aipiia 20-aulciicigic	104260	AF005900	Chr.2
			aipiia-zo-aulciicigio	104250	J03853	4q16.1
			beta-1-adrenergic receptor/ADRB1	109630	J03019	10q24-q26
		Recentors	Beta-2-Adrenergic ReceptorADRB2	109690	M15169	5q32-q34
		siordana.	beta-adrinergic receptor kinase	100625	NM 00161	
			1/BARK1	102020	6	11cen-q13
			Beta-2-Adrenergic Receptor-Like	100760	000230	6-110
			Protein G-21/ADRB2L	102/00	470/CV	c1b-7:11bc
			Beta-3-Adrenergic Receptor/ADRB3	169601	X70811	8p12-p11.2

7 2 2 3 3 3 3		Beta-Adrenergic Receptor Kinase I/ADRBK1	109635	X61157	11cen-q13
Epinepurine and Noreninenhr		Beta-Adrenergic Receptor Kinase 2/ADRBK2	109636	X69117	22q11
ine		phosphodiesterase 4A, cAMP- specific/PDE4A	600126	NM_00620 2	19p13.2
		phosphodiesterase 4B, cAMP-specific/PDE4B	600127	NM_00260 0	1p31
		phosphodiesterase 4C, cAMP-specific/PDE4C	600128	***	Chr.19
	Response	phosphodiesterase 4D, cAMP-specific/PDE4D	600129	NM_00620 3	5q12
		phosphodiesterase 7A, cAMP-specific/PDE7A	171885	L12052	8q13-q22
Î		phosphodiesterase 8A, cAMP-specific/PDE8A	226209	AF056490	**
		phosphodiesterase 9A, cAMP-specific/PDE9A	602973	NM_00260 6	21q22.3
		Vesicular Amine Transporter 2/VAT2	193001	L09118	10q25
	Untake	Vesicular Amine Transporter 1/VAT1	193002	***	8p21.3
		Solute carrier family 6, member 5/SLC6A2/NAT1/NET1	163970	NM_00104 3	16q12.2
		Monoamine Oxidase A/MAOA	309850	M69226	Xp11.23
	Catabolism	Monoamine Oxidase B/MAOB	309860	M69177	Xp11.23
		Catechol-O-Methyltransferase/COMT	116790	M58525	22q11.2
		Aromatic L-Amino Acid	0.000	0000	
	Biosynthesis	Decarboxylase/AADC/dopa decarboxylase	10/930	M/6180	/p11
	:	Tyrosine Hydroxylase	191290	X05290	11p15.5

		Dopamine Receptor D1	126449	X58987	5q35.1
		Dopamine Receptor D2/DRD2	126450	NM_00079 5	11923
٠.	Receptors	Dopamine Receptor D3/DRD3	126451	U32499	3q13.3
-		Dopamine Receptor D4	126452	L12398	11p15.5
Donamine		Dopamine Receptor D5	126453	M67439	4p16.1- p15.3
Ammada a	Reuptake	Dopamine Transporter/ DAT1	126455	L24178	5p15.3
		Dopamine Beta- Hydroxylase/monooxygenase	223360	96000X	9q34
		Catechol-O-Methyltransferase	116790	M58525	22q11.2
		Monoamine Oxidases A	309850	M69226	Xp11.23
	Cataholism	Monoamine Oxidases B	309860	M69177	Xp11.23
·		Phenol Sulfotransferase 1	171150	L10819	16p12.1- p11.2
		Phenol Sulfotransferase 2	601292	X78282	16p12.1- p11.2
		Phenol Sulfotransferase 3	600641	L19956	16p11.2
	Biosynthesis	adenylosuccinate lyase/ADSL	103050	103050 NM_000026	22q13.1
		adenylosuccinate synthetase/ADSS	103060	103060 NM_001126	1cen-q12
		Adenosine A1 Receptor; Adora1/G			
		protein-coupled	102775	L22214	1q32.1
		Adenosine A2 Receptor; Adora2a/G			
		protein-coupled	102776	X68486	22q11.2
		Adenosine A2b Receptor; Adora2b/G			
		protein-coupled	600446	X68487	17p12-p11.2
		Adenosine A3 Receptor; Adora3/G			
		protein-coupled	600445	L20463	1p21-p13

		Adenosine A2 Receptor-			
		like/ADORA2L1	102777	***	10q25.3-q26.2
		Purinergic Receptor P2x, Ligand-			
		Gated Ion Channel, 1; P2rx1	600845	600845 NM_002558	****
		Purinergic Receptor P2x, Ligand-			
		Gated Ion Channel, 3; P2rx3	600843	Y07683	11912
	Receptors	Purinergic Receptor P2x, Ligand-			
Adenosine		Gated Ion Channel, 4; P2rx4	600846	AF000234	12q24.32
		Purinergic Receptor P2x, Ligand-			
		Gated Ion Channel, 5; P2rx5	602836	602836 NM_002561	***
		Purinergic Receptor P2x, Ligand-			
		Gated Ion Channel, 7; P2rx7	602566	Y09561	12q24
		P2Y11 purinoceptor/G protein-	602697	****	****
		P2Y7 purinoceptor/leukotriene B4			
		receptor/G protein-coupled		601531 NM_000752 14q11.2-q12	14q11.2-q12
		P2Y2 purinoceptor/G protein-coupled	600041	U07225	1q13.5-q14.
		P2Y1 purinoceptor/G protein-coupled	601167	U42029	3925
		P2Y4 pyrimidinergic receptor/G			
-		protein-coupled	300038	300038 NM_002565	Xq13
		P2Y6 pyrimidinergic receptor/G			
		protein-coupled	602451	602451 NM_004154	11913.5
		Solute carrier family 29 (nucleosides),			
	Reinfake	member 1/SLC29A1/ENT1	602193	602193 NM_0049556p21.2-p21.1	5p21.2-p21.1
	a de la companya de l	Solute carrier family 29 (nucleosides),			
		member 2/SLC29A2/ENT2	602110	X86681	11q13
	Catabolism	adenosine deaminase	102700	102700 NM_000022	20q13.11
		Choline acetyltransferase/CHAT	118490	118490 NM_003055	10q11.2
	Biosynthesis	Biosynthesis camitine acetyltransferase/CRAT	600184	600184 NM 004003	9q34.1
		apolipoprotein E	107741	107741 NM_000041	19q13.2

			Cholinergic Receptor, Muscarinic, 1;			
			CHRM1 ::	118510	X15263	11q13
			Cholinergic Receptor, Muscarinic, 2;			
			CHRM2	118493	U19800	7q35-q36
			Cholinergic Receptor, Muscarinic, 3;			
			CHRM3	118494	U29589	1q41-q44
			Cholinergic Receptor, Muscarinic, 4;			
			CHRM4	118495	M16405	11p12-p11.2
			Cholinergic Receptor, Muscarinic, 5;		-	
			CHRM5	118496	AF026263	15q26
			Nicotinic, Cholinergic receptor alpha 1	100690	X70108	2q24-q32
Neurotransm			Nicotinic, Cholinergic receptor alpha 2 118502	118502	U62431	Chr.8
itter and		Receptors	Nicotinic, Cholinergic receptor alpha 3	118503	X53559	15q24
Peptide	Acetylcholin		Nicotinic, Cholinergic receptor alpha 4 118504	118504	U62433	20q13.2-q13
Hormone	Ð		Nicotinic, Cholinergic receptor alpha 5	118505	M83712	15q24
Inflammetor			Nicotinic, Cholinergic receptor alpha			
>			7/CHRNA7	118511	U40583	15q14
Modulation			Nicotinic, Cholinergic receptor beta 1	100710	X14830	17p12-p11
			Nicotinic, Cholinergic receptor beta 2	118507	Y08415	1p21
			Nicotinic, Cholinergic receptor beta 3	118508	X67513	8p11.2
			Nicotinic, Cholinergic receptor beta 4	118509	X68275	15q24
			Nicotinic, Cholinergic receptor epsilon			
			polypeptide	100725	X66403	Chr.17
			Nicotinic, Cholinergic receptor,	100720	X55019	2q33-q34
			Nicotinic, Cholinergic receptor,	100730	100730 NM_005199	2q33-q34
		Reuptake	Vesicular acetylcholine transporter	600336	600336 NM_003055	10q11.2
		-	Acetylcholinesterase/ACHE	100740	M55040	7q22
			butyrylcholinesterase 1/serum			
		Catabolism	cholinesterase 1/BCHE1	177400	177400 NM_000055 3q26.1-q26.2	3q26.1-q26.

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		butyrylcholinestarase 2/serum			
		cholinesterase 2/BCHE2	177500	****	2933-935
		voltage-dependent calcium channel,			
		P/Q type, alpha 1A	141500	141500 NM 000068	19p13
		calcium channel, voltage-dependent, L			
		type, alpha 1B subunit/CACNA1B	601012	601012 NM_000718	9q34
		calcium channel, voltage-dependent, L			
		type, alpha 1C subunit/CACNA1C	114205	114205 NM_000719	12p13.3
		calcium channel, voltage-dependent, L			e e
		type, alpha 1D subunit/CACNA1D	114206	114206 NM_000720	3p14.3
		L-type voltage dependent calcium			
	Calcium	channel alpha 1S subunit/CACNA1S	114208	114208 NM_000069	1q32
	Channels	calcium channel, voltage-dependent,			
		beta 1 subunit/CACNB1	114207	114207 NM 000723	17q21-q22
•		voltage dependent calcium channel			
		beta 2 subunit/CACNB2	600003	U07139	10p12
		calcium channel, voltage-dependent,			
		alpha 2/delta subunit/CACNA2D1	114204	Z28613	7q21-q22
		calcium channel, voltage-dependent,			
		gamma subunit/CACNG	114209	114209 NM_000727	17q24
		neuronal voltage dependent calcium			
		channel gamma subunit/CACNG2	602911	602911 NM 006078	****
		sodium channel, nonvoltage-gated 1,			
	Sodium	beta (Liddle syndrome)/SCNN1B	092009	600760 NM_000336 16p13-p12	16p13-p12
	Channels	sodium channel, nonvoltage-gated 1,			
		gamma/SCNN1G	600761	600761 NM_001039 16p13-p12	16p13-p12
Channels		cyclic nucleotide gated			
		hyperpolarization activated potassium 602780 AF064876	602780	AF064876	****

		cyclic nucleotide gated			
		hyperpolarization activated potassium	602781	AF064877	****
		potassium inwardly-rectifying channel,			
		subfamily J, niember 2 (KCNJ2	600681	600681 NM 000891	Chr. 17
		voltage dependent potassium channel,			
		subfamily K, member 2/KCNK2	603219	****	1941
		G protein coupled potassium channel,			
	Potassium	subfamily J, member	601534	601534 NM 002239	2q24.1
	Channels	G protein coupled potassium channel			
		inward rectifier/GIRK3	600932	***	1q21-q23
		voltage dependent potassium channel,			
		subfamily S, member 3/KCNK3	603888	AF043472	.2p24
	•	potassium voltage-gated channel			
•		precursor, KQT-like subfamily,			
		member 1/KCNQ1	192500	192500 NM 000218	11p15.5
		potassium intermediate/small			
	•	conductance calcium-activated			
		channel, subfamily N, member	602754	602754 NM 002250	19q13.2
		chloride channel, calcium activated,			
		family member 1/CLCA1	906609	603906 NM_001285	1p31-p22
	Chloride	chloride channel, calcium activated,			
		family member 2/CLCA2	604003	604003 NM_006536	****
		cystic fibrosis transmembrane			
		conductance regulator/CFTR	602421	602421 NM_000492	7q31.2
		membrane			
		metalloendopeptidase/MME/neutral			
		endopeptidase	120520	120520 AH002677	3q21-q27
		proopiomelanocortin	176830	176830 NM 000939	2p23.3

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	Biosynthesis	Biosynthesis prepronociceptin/nociseptin/nosistatin/	601459	***	8n71
		preproenkephalin			1145
		B/prodynorphin/PDYN	131340	NM 006211	131340 NM 00621120pter-p12.21
		preproenkephalin			
Opioids		A/proenkephalin/PENK	131330	131330 NM_006211	8q23-q24
•		Opioid Receptor, Mu-1; Oprm1	600018	NM_00091 4	6924-925
		Opioid Receptor, Kappa-1; Oprk1	165196	U17298	8q11.2
	•	opioid receptor-like 1/OPRL 1	602548	X77130	****
	Recentors	Opioid Receptor, Delta-1; Oprd1	165195	U10504	1p36.1-p34.3
		Opioid Receptor, Sigma 1	601978	U75283	****
		opioid binding cell adhesion			
	•	molecule/OBCAM	600632	****	Chr.11
		G protein-coupled receptor 7/GPR7	600730	U22491	0q11.2-q21.1
		G protein-coupled receptor 8/GPR8	600731	U22492	20q13.3
Lentin	Biosynthesis leptin/LEP	leptin/LEP	164160	164160 NM_000230	7q31.3
	Receptor	leptin receptor/LEPR	601007	601007 NM_002303	1p31
Cholecystoki	Biosynthesis		118440	L00354	3pter-p21
nin (CCK)	Receptors	Cholecystokinin A receptor/CCKAR	118444	L13605	4p15.2-p15.1
		Cholecystokinin B receptor/CCKBR	118445	L08112	1p15.5-p15.4
		Neurokinin A/Tachykinin 1 or	000001	1177600	
Tachykinin	Biosynthesis	Biosynthesis 2/Substance P or K	102320	675/50	7q21-q22
or Substance		Neurokinin B/Tachykinin 3	162330	***	12q13-q21
Por		Tachykinin NK1 receptor/TACR1	162323	M81797	Chr.2
Neurokinin	Receptors	Tachykinin NK2 receptor/TACR2	162321	M57414	10q11-q21
		Tachykinin NK3 receptor/TACR3	162332	M89473	****
	Biosynthesis	kininogen/KNG	228960	***	3q27
		kallikrein 1/KLK1	147910	AH002853	AH002853 9q13.2-q13.4

_	-		bradykinin receptor B1/BDKRB1 G			
	Bradykının	ſ	protein-coupled	600337	NM_000710	600337 NM_000710 4q32.1-q32.2
		Receptor	bradykinin receptor B2/BDKRB2 G			
			protein-coupled	113503	NM_000623	113503 NM_000623 4q32.1-q32.2
			parathyroid hormone-related		NIM 00282	12n121_
-			protein/parathyroid hormone-like	168470	70700 - WINI	12012.1-
	Farathyroid		hormone/PTHLH		0	7:114
	Hormone		parathyroid hormone/PTH	168450	168450 NM_000315 1p15.3-p15.	1p15.3-p15.1
	(FIH)		parathyroid hormone receptor	168468	168468 NM_000316 3p22-p21.1	3p22-p21.1
		Keceptors	parathyroid hormone receptor	601469	601469 NM_005048	2q33
		Biosynthesis	proopiomelanocortin	176830	176830 NM_000939	2p23.3
			melanocortin 1 receptor (alpha			
			melanocyte stimulating hormone			
			receptor)/MC1R	155555	155555 NM_002386	16q24.3
	ACTH		melanocortin 2 receptor/ACTH			
			receptor/MC2R	202200	202200 NM_000529	18p11.2
			melanocortin 4 receptor/MC4R	155541	155541 NM_005912	18q22
		Receptor	melanocortin 5 receptor/MC5R	600042	NM_00591 3	18p11.2
			Folate Receptor Alpha/FOLR1	136430	M28099	1q13.3-q13.
		Receptors	Folate Receptor Beta/FOLR2	136425	AF000380	1q13.3-q13.5
			Folate Receptor Gamma/FOLR3	602469	Z32564	***
		E	Folate Transporter (SLC19A1)	600424	U19720	21q22.3
		ransporter	Vitamin B12 binding protein	275350	275350 NM_000355 22q11.2-qter	22q11.2-qter
	*	Glutaminati		136510	M98045	9cen-q34
		00	gamma-glutamyl hydrolase/GGH	601509	USS206	****
			Methylenetetrahydrofolate			
			reductase/MTHFR	236250	U09806	1p36.3
			Dihydrofolate reductase/DHFR	126060	J00140	5q11.2-q13.2

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		5,10-methylenetetrahydrofolate			
		dehydrogenase, 5,10-			
		methylenetetrahydrofolate			
		cyclohydrolase, 10-		<u> </u>	
		formyltetrahydrofolate			
		synthetasc/MTHFD1	172460	172460 NM 005956	14q24
		5,10-methenyltetrahydrofolate			
		synthetase (5-formyltetrahydrofolate			-
Folate		cyclo-ligase)/MTHFS	604197	604197 NM 006441	Chr. 15
Metabolism		phosphoribosylglycinamide			
		formyltransferase,			
		phosphoribosylglycinamide			
	Motobolism				
	victabolisiii	phosphoribosylaminoimidazole	138440	138440 NM 000819	21922.1
		folate hydrolase 1/FOH1	600934	600934 NP 004467	1
		6-pyruvoyl tetrahydrobiopterin			
		synthase/PTPS	261640	Q03393	1q22.3-q23.
		serine hydroxymethyltransferase 1			
		(soluble)/SHMT1	182144	182144 NM 004169	17p11.2
		serine hydroxymethyltransferase 2			
		(mitochondrial)/SHMT2	138450	138450 NM_005412	12q13
		Glycine aminotransferase/glycine			
		cleavage T protein/GAT	238310	238310 NM 000481Bp21.2-p21.	3p21.2-p21.
		5-methyltetrahydrofolate-			
		homocysteine			
•		methyltransferase/methionine	156570	156570 NM_000254	1q43
		glutamate			
		förmiminotransferase/dihydrofolate			
		synthetase	229100	****	****

			hypoxantnine-guanine			
			phosphoribosyltransferase	308000	M31642	Xq26-q27.2
			adenosine		NM_00048	
			phosphoribosyltransferase/APRT	102600	S	16q24
General Cell					NM_00036	
Growth			thiopurine S-methyltransferase/TPMT	187680	7	6p22.3
			IMP (inosine monophosphate)		NM_00088	
			dehydrogenase 1/IMPDH1	146690	3	7q31.3-q32
			IMP (inosine monophosphate)		88000 WN	
			dehydrogenasc 2/IMPDH2	146691	4	3p21.2
	Purine	Purine			NM_00112	
	Metabolism	Metabolism	adenylosuccinate synthetase/ADSS	103060	9	1cen-q12
					NM_00002	
			adenylosuccinate lyase	103050	9	22q13.1
			glycinamide ribotide formyltransferase 138440	138440		21q22.1
			urate oxidase	191540	AH003594	1p22
					NM_00027	
			purine nucleoside phosphorylase	164050	0	14q13.1
					12000 WN	
			xanthine oxidase	278300	6	2p23-p22
					NM_00002	
			adenosine deaminase	102700	2	20q13.11
			beta tubulin/TUBB	191130	6 90100 MN	6p21.3
					80900 WN	
			beta tubulin 2/TUBB2	602660	8	***
	Cytoskeleton	Tubulin	beta tubulin 4/TUBB4	602661	NM_00608	****
				_	NM 00608	
			beta tubulin 5/TUBB5	602662		***

				NM 00107	
		gamma tubulin/TUBG	191135	0_	***
				NM_00045	
		superoxide dismutase 1/SOD1	147450	4	21q22.1
		superoxide dismutase 2,			
		mitochondrial/SOD2	147460	X65965	6q25.3
		thioredoxin-dependent peroxide		NM_00580	
		reductase/TDPX1	600538	6	13q12
Oxygen		peptide methionine sulfoxide			
Stress		reductase/MSRA	601250	***	***
(additional	Oxygen			NM_00557	
genes in	Stress	lipoprotein, Lp(a)/LPA	152200	7	6q27
Toxicology)		succinate dehydrogenase complex,			
		subunit C, integral membrane		NM_00300	
		protein/SDHC	602413	1	1921
		glucose-6-phosphate		NM_00040	
		dehydrogenase/G6PD (mitochondrial) 305900	305900	2	Xq28
				NM_00115	
 		aldehyde oxidase 1/AOX1	602841	6	2q33

		Table 5. N	Table 5. Meatbolism and Endocrinology Gene List	ist		
Class	Pathway	Function Name	Name	OMIM	CID	Locus
			membrane			
			metalloendopeptidase/neutral	120520	120520 NM_000902 3q21-q27	3q21-q27
			calpain, large polypeptide L3/CAPN3 114240 NM_000070 5q15.1-q21.1	114240	NM_000070	5q15.1-q21
			leucyl/cystinyl	151300	151300 NM 005575	****
			carboxypeptidase N polypeptide			
			1/CPN1	603103	603103 NM 001308 chr. 10	chr. 10

			corpovementidose N no montido			
			2/regulatory subunit/CPN2	603104	J05158	8p23-p22
General	Dontido	Drotonog	meprin alpha subunit/MEP1A	600388	600388 NM_0059256p21.2-p21	6p21.2-p21.1
Metabolism	Hormone	rioteases	carboxypeptidase E/CPE	114855	114855 NM_001873	Chr.4
for Peptide	Processing	Inhihitore		601197	601197 NM_003320	11p15.5
Hormones	Suicessort	SIOMOTHIN	meprin beta subunit/MEP1B	600389	600389 NM_005925 8q12.2-q12	8q12.2-q12.3
			prolyl endopeptidase/PREP	600400	600400 NM 002726	6q22
			neuroendocrine convertase			
			1/NEC1/proprotein convertase			
			subtilisin/kexin type 1/PCSK1	162150	162150 NM_000439	5q14-q21
			peptidylglycine alpha-amidating			
			monooxygenase /PAM/NEC2	170270	170270 NM_000919	5q14-q21
			paired basic amino acid cleaving			
			enzyme/PACE/FUR	136950	NM_002569	15q25-q26
			serotonin N-Acetyltransferase/SNAT	600950	U40347	17q25
			X-chromosomal acetylserotonin N-			
			methyltransferase/ASMT	300015	300015 NM_004043 Xpter-p22.32	Xpter-p22.32
			Y-chromosomal acetylserotonin N-			
	Circadian	Molotonia	methyltransferase/ASMT	402500	****	Ypter-p11.2
	Regulation	Melatomin	acetylserotonin N-methyltransferase-			
			like/ASMTL	300162	300162 NM_004192Xpter-p22.32	Xpter-p22.32
			melatonin receptor 1A/MTNR1A	600665	600665 NM_005958	4q35.1
			melatonin receptor 1B/MTNR1B	600804	600804 NM_005959	11q21-q22
			tryptophan 2,3-dioxygenase/TDO2	191070 NM	NM_005651	4q31-q32
			corticotropin releasing hormone/CRH	122560	NIM	8q13
			urocortin/UCN	600945	NM_003353	Chr.2
			urocortin 2/UCN2	604097	AF104118	***
			Corticotropin releasing hormone			
		CRH	receptor 1/CRHR1	122561	U16273	17q12-q22
			e e e e e e e e e e e e e e e e e e e			
			Day 1			
			4czf01_xls			Pa
	•		- COMPANIENT COMPANIEN			

	,				
Aurenocoruc		Corticotropin releasing hormone	602034	602034 NM 001883	7n21.n15
Hormone		Corticotropin releasing hormone-			1
		binding protein/CRHBP	122559	NM_001882	122559 NM_001882 5q11.2-q13.3
		proopiomelanocortin/POMC	176830	176830 NM_000939	2p23.3
	ACTH	melanocortin 2 receptor/ACTH			
		receptor/MC2R	202200	202200 NM_000529	18p11.2
		thyrotropin releasing hormone/TRH	275120	275120 NM_007117	3p
	TRH	thyrotropin releasing hormone			
		receptor/G protein coupled/TRHR	188545	188545 NM_003301	8q23
		cAMP responsive clement binding	123810	123810 NM_00437	222 2 224
		protein 1/CREB1	123010	6	2422.3-43 4
		chorionic gonadotropin alpha			
	TCH	chain/TSHA/CGA	118850	118850 NM_000735 6q21.1-q23	6q21.1-q23
	IICI	thyroid stimulating hormone beta			
		chain/TSHB	188540	188540 NM_000549	1p13
		thyroid stimulating hormone			
		receptor/TSHR	603372	603372 NM_000369	14q31
		mily 5 (sodium iodide	601843	601843 NM_00045	15
	<u>()</u>	symporter), member 5/SLC5A5	CL0100	3	p12
			274500	274500 NM_00054	2 Lu C
		encoding mitochondrial protein)/TPO	2021	7	e d'a
		عال ساريان المراسيداء	188450	NM_00323	8q24.2-
		myrogrodania r O	004001	5	q24.3
-		thyroxin-binding globulin/TBG	314200	314200 NM_00035	Xq22.2
Thyroid		transthyretin (prealbumin, amyloidosis	176300	NM_00037	18q11.2-
Hormone		type I)/TTR		-	q12.1

-	_				
		deiodinase, iodothyronine, type I/DIO1	147892	NM_00079 2	1p33-p32
	Thyroid	deiodinase, iodothyronine, type II/DIO2	601413	NM_00079	14q24.2- q24.3
	Hormone Synthesis	thyroid hormone receptor, alpha (avian erythroblastic leukemia viral (v-erb-a) oncogene homolog)/THRA	190120	NM_00325	17q11.2
Peptide Hormones Control of		thyroid hormone receptor, alpha (avian erythroblastic leukemia viral (v-erb-a) oncogene homolog 2)/THRB	190160	S57224	3p24.3
Metabolism		thyroid hormone receptor coactivating protein/SMAP	601836	09900_MN 6	***
		silencing mediator for retinoid and			
		thyroid hormone receptors/SMRT	600848	600848 NM 006312	* * * *
		retinoic and thyroid hormone receptor			
		associated corepressor			
		1/TRAC1/NCOR1	600849	600849 NM_006311	****
		deiodinase, iodothyronine, type III/DIO3	601038	NM_00136	14q32
	CNBII	gonadotropin releasing hormone			
	GINKH	1/LHRH/GNRH1	152760	152760 NM_000825 8p21-p11.2	8p21-p11.2
		gonadotropin releasing hormone			
	Ponadotronin	gonadotropin 2/LHRH/GNRH2	602352	602352 NM_001501	20p13
	s except	gonadotropin releasing hormone			
	$CGH\dot{J}$	receptor/G protein-			
		coupled/LHRHR/GNRHR	138850	138850 NM_000406	4q21.2
	Prolactin	prolactin/PRL	176760	176760 NM_0009486p22.2-p21.	5p22.2-p21.3
	ATORACHIA	prolactin receptor/PRLR	176761	176761 NM_000949 5p13-p12	5p13-p12

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glycoprotein hormones, alpha
ones, alpha

•		71117117	Chorionic gonadotronin heta			
		Gonadotropi	Gonadotropil			
		<u>-</u>	polypeptide/CGB	118860	118860 NM_000737	19q13.32
		:	luteinizing			
			hormone/choriogonadotropin	152790	152790 NM 000233	2p21
-			3-hyd oxy-3-methylglutaryl-			ı
			Coenzyme A synthase 1	142940	142940 NM_002130	5p14-p13
			HMGCoA reductase/HMGCR	142910	142910 NM_000859 5q13.3-q14	5q13.3-q14
			squalene synthetase/amesyl-			
			diphosphate famesyltransferase	184420	184420 NM_004462 8p23.1-p22	8p23.1-p22
_			steroid-5-alpha-reductase, alpha			
			polypeptide 1 (3-oxo-5 alpha-steroid			
			delta 4-dehydrogenase alpha			
		8	1)/SRD5A1	184753	184753 NM 001047	5p15
·	•		steroid-5-alpha-reductase, alpha			
		ž.	polypeptide 2 (3-oxo-5 alpha-steroid			
			delta 4-dehydrogenase alpha			
			2)/SRD5A2	264600	264600 NM 000348	2p23
		Anabolism	steroidogenic acute regulatory protein/STAR	600617	600617 NM_00034	8p11.2
			cytochrome P450, subfamily XIA			
			(cholesterol side chain	118485	118485 NM_00078	15q23-q24
			cleavage)/CYP11A		-	
Gene	eral		ferredoxin 1/FDX1	103260	NM_00410 9	11922
Ster	pio.		cytochrome P450, subfamily XVII			
Hormone	rmone		(steroid 17-alpha-hydroxylase),	202110	202110 NM_00010	10q24.3
Metab	nolism		adrenal hyperplasia/CYP17		7	

(additional genes in Toxicology)		hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 1/HSD3B1	109715	109715 NM_00086	1p13.1
		hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2	201810	201810 NM_00019 8	1p13.1
		dehydroepiandrosterone (DHEA)- preferring sulfotransferase, family 2A, 125263 NM_00316 member 1/SULT2A _{il}	125263	NM_00316	19q13.3
		estrogen-preferring	600043	600043 NM 005420	4q13.1
		UDP glycosyltransferase 1/UGT1	191740	191740 NM_00107	Chr. 12
·	Catabolism	UDP glycosyltransferase family 2, member B4/UGT2B4	290009	600067 NM_00107	4q13
		UDP glycosyltransferase family 2, member B7/UGT2B7	890009	600068 NM_00107	1914
		UDP glycosyltransferase 2 family, polypeptide B11/UGT2B11	603064	603064 NM_00107	***
		UDP glycosyltransferase family 2, member B15/UGT2B15	690009	NM_00107 6	4q13
		UDP glycosyltransferase family 2, member B17/UGT2B17	601903	NM_00107	1914
		hydroxy-delta-5-steroid dehydrogenase, 3 bcta- and steroid delta-isomerase 1/HSD3R1	109715	109715 NM_00086	1p13.1
	Synthesis	steroid	201810	201810 NM_00019	lp13.1

	2	922		*		-:	_		2	۳,	-	Γ							124	T		12	_
	11922	1921.2-922	6p12	* * *		15q21.1	6q25.1	149	11912	14q24.3	4q13.1				5p15		9q22	,	15q23-q24	2023		Xq11-q12	4913
	264080 NM_00092	****	104988	NM_00411 7		107910 NM 000103	133430 NM_000125	X99101	NM_004451	NM_004452	600043 NM 005420				184753 NM_001047		264300 NM 000197	NM 00078	1	264600 NM 000348		313700 NM_000044	601903 NM 001077
	264080	140571	140572	602623		107910	133430	601663	601998	602167	600043				184753		264300	0	118485	264600		313700	601903
	progesterone receptor/PGR	heat shock 90-kD protein 1, alpha subunit/HSPCA	heat shock 90-kD protein 1, beta subunit/HSPCB	FK506-binding protein 5/FKBP5	cytochrome P450, subfamily XIX	(androgen aromatase)/CYP19	estrogen receptor 1/ESR1	estrogen receptor 2/ESR2	estrogen-related receptor	estrogen-related receptor beta/ESRRB	estrogen-preferring	steroid-5-alpha-reductase, alpha	polypeptide 1 (3-oxo-5 alpha-steroid	delta 4-dehydrogenase alpha	1)/SRD5A1	hydroxysteroid (17-beta)	denydrogenase 3/HSD1/B3	cytochrome P450, subfamily XIA	cholester of side chain cleavage)/CYP11A	steroid 5-alpha-reductase 2/SRD5A2	androgen receptor	(dihydrotestosterone receptor)/AR	UDP glycosyltransferase 2 family, Catabolism polypeptide B17/UGT2B17
		Recentors				Synthesis		Receptors			Catabolism					Synthesis						Receptor	Catabolism
•	Progestins							Estrogens										Androgens					
_								Steroid	Hormones										···········				

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		cytochrome P450, subfamily XXI			
		(steroid 21-hydroxylase)/CYP21	201910	X58902	6p21.3
		cytochrome P450, subfamily XIB			
	Synthesis	(steroid 18-beta-hydroxylase),			٠
		polypeptide 2/CYP11B2	124080	124080 NM_000498	8q21
		cytochrome P450, subfamily XIB			
		(steroid 11-beta-hydroxylase),			
		polypeptide 1/CYP11B1	202010	202010 NM_000497	8q21
		glucocorticoid receptor/GRL	138040	38040 NM_000176	5q31
		heat shock 70kD protein 1/HSPA1A	140550	140550 NM 005345	6p21.3
Clucocortico		heat shock 70kD protein-like			
steroide		1/HSPA1L	140559	140559 NM_005527	6p21.3
(cortisol		heat shock 70kD protein 1/HSPA1B	603012	603012 NM 005346	6p21.3
corticosteron	Docentor	heat shock 90-kD protein 1, alpha			
(a)	ond	subunit/HSPCA	140571	****	1q21.2-q22
6	Cofectors	heat shock 90-kD protein 1, beta			
	61000000	subunit/HSPCB	140572	104988	6p12
	40 m	FK506-binding protein 4			
	, ,	(59kD)/FKBP4	600611	600611 NM_002014	***
		mineralocorticoid			
		receptor/MCR/nuclear receptor			
		subfamily 3, group C, member	600983	600983 NM_000901	4q31.1
	Transport	corticosteroid binding globulin			
	andCatabolis	precursor/CBG	122500	122500 NM 001756	14q32.1
	and Catabons	hydroxy-D-5-steroid dehydrogenase, 3			
		b- and steroid D-isomerase 2/HSD3B2	201810	201810 NM_000198	1p13.1
		cytochrome P450, subfamily XIB,			
		polypeptide 2 (steroid 11-b-			
		hydroxylase)/CYP11B2	124080	124080 NM_000498	8q21

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Synthesis Receptor Transcriptio n Factors Receptors Receptors Receptors				sodium channel, nonvoltage-gated 1			
(aldosterone, deoxycortico sterone) Mediators of Transcriptio and Factors Serotonin Receptors Dopamine Receptors In Factors Biosynthesis		/ineralocort	Synthesis	alpha/SCNN1A	600228	600228 NM_001038	8 12p13
deoxycortico sterone) Mediators of Transcriptio Response Response Bopamine Receptors Norepinephr Receptors ine Biosynthesis		aldosterone.		sodium channel, nonvoltage-gated 1,			
Sterone) Mediators of Transcriptio Steroid n Factors Response Receptors Dopamine Receptors ine Biosynthesis	ייייייייייייייייייייייייייייייייייייי	eoxycortico		beta (Liddle syndrome)/SCNN1B	600760	NM_00033	600760 NM_000336 16p13-p12
Mediators of Transcriptio Steroid n Factors Response Receptors Dopamine Receptors ine Biosynthesis		sterone)		sodium channel, nonvoltage-gated 1,	•		
Mediators of Transcriptio Steroid n Factors Response Receptors Dopamine Receptors Norepinephr Receptors ine Biosynthesis		(2000)		gamma/SCNN1G	600761	NM_00103	600761 NM_001039 16p13-p12
Mediators of Transcriptio Steroid n Factors Response Receptors Dopamine Receptors ine Biosynthesis				mineralocorticoid			
Mediators of Transcriptio Steroid n Factors Response Receptors Dopamine Receptors ine Biosynthesis				receptor/MCR/nuclear receptor			
Mediators of Transcriptio Steroid n Factors Response Receptors Dopamine Receptors ine Biosynthesis			Receptor	subfamily 3, group C, member	600983	600983 NM_000901	1 4q31.1
Mediators of Steroid n Factors Response Serotonin Receptors Dopamine Receptors ine Biosynthesis			·	nuclear teceptor coactivator 2/GRIP1	601993	601993 NM_006540	******
Mediators of Transcriptio Steroid n Factors Response Receptors Dopamine Receptors Norepinephr Receptors ine Biosynthesis				oxysterol binding protein/OSBP	167040	167040 NM_002556	6 11q12-q13
Steroid n Factors Response n Factors Serotonin Receptors Dopamine Receptors ine Biosynthesis	_2	Tediatore of		sterol regulatory element binding			
Response n Factors Serotonin Receptors Dopamine Receptors ine Biosynthesis		Steroid	Transcriptio	transcription factor 1/SREBF1	184756	184756 NM_004176	6 17p11.2
Serotonin Receptors Dopamine Receptors Norepinephr Receptors ine Biosynthesis		Resnonse	n Factors	sterol regulatory element binding			
Serotonin Receptors Dopamine Receptors Norepinephr Receptors ine Biosynthesis				transcription factor 2/SREBF2	600481	600481 NM_004599	9 22q13
Serotonin Receptors Dopamine Receptors Norepinephr Receptors ine Biosynthesis				steroid receptor coactivator 1/SRC1	602691	602691 NM_003743	3 2p23
Serotonin Receptors Dopamine Receptors Norepinephr Receptors ine Biosynthesis				steroid receptor RNA activator/SRA	603819	AF092038	Chr. 5
Serotonin Receptors Dopamine Receptors Norepinephr Receptors ine Biosynthesis				5-hydroxytryptamine (serotonin)			
Dopamine Receptors Norepinephr Receptors ine Biosynthesis		Serotonin		receptor 2C (G protein-			
Dopamine Receptors Norepinephr Receptors ine Biosynthesis	Normal			coupled)/HTR2C	312861	312861 NM_000868	8 Xq24
Norepinephr Receptors ine Biosynthesis		Donamine		dopamine receptor D1/DRD1	126449	126449 NM_000794	4 5q35.1
Norepinephr Receptors ine Biosynthesis		2 opanima		dopamine receptor D2/DRD2	126450	126450 NM_000795	11923
Receptors Biosynthesis		oreninenhr		adrenergic, beta-2-, receptor,			
Biosynthesis	1	ine		surface/ADRB2	109690	109690 NM_000024	4 5q32-q34
Biosynthesis				adrenergic, beta-3-, receptor/ADRB3	109691	109691 NM_000025	5 8p12-p11.2
			Biosynthesis	Neuropeptide Y/NPY	162640	162640 NM_000905	5 7p15.1
				Neuropeptide Y receptor Y1/NPY1R	162641	162641 NM_000909	9 4q31.3-q32
		Nauronantid		Neuropeptide Y receptor Y2/NPY2R	162642	162642 NM 000910	J 4q31

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e Y (NPY)	Recentors	Neuropeptide Y receptor			
	s to days	Y3/chemokine receptor	162643	X71635	2q21
	:-	Neuropeptide Y receptor Y5/NPY5R	602001	602001 NM 006174	4a31-a32
		Neuropeptide Y receptor Y6/NPY6R	601770	601770 NM 006173	
	Biosynthesis	Biosynthesis preprogalanin/GAL1	137035	L11144	1q13.3-q13.
Galanin		galanin receptor 1 (brain)/GALR1	600377	600377 NM 001480	J1
	Receptor	galanin receptor 2/GALR2	603691	603691 NM 003857	_
		galanin receptor 3 (brain)/GALR3	603692	603692 NM_00361422q12.2-q13.	2q12.2-q13.
		pro-melanin-concentrating			
		hormone/PMCH	176795	176795 NM_002674 12q23-q24	12q23-q24
	Riocynthesis				
Pro-Melanin	eres) mures is	like 1/PMCHL1	176793	****	5p14
Concentratin		pro-melanin-concentrating hormone-			
g Hormone		like 2/PMCHL2	176794	AF064698	5q12-q13
		melanin-concentrating hormone			
	Receptors	receptro/MCHR/G protein-coupled			
		receptor 24/GPR24	601751	601751 NM 005297	22q13.3
	Biosynthesis	Biosynthesis proopiomelanocortin/POMC	176830	176830 NM_000939	2p23.3
		melanocortin 1 receptor (alpha			
		melanocyte stimulating hormone			
Melanocorti	Recentors	receptor)/MC1R	155555	155555 NM_002386	16q24.3
u	s roldana	melanocortin 4 receptor/MC4R	155541	155541 NM_005912	18q22
		melanocortin 5 receptor/MC5R	600042	NM_00591 3	18p11.2
	Regulation	agouti (mouse)-signaling protein/ASIP 600201	600201	NM_00167	20q11.2
		cAMP responsive element binding protein 1/CREB1	123810	NM_00437 9	2q32.3-q34
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	•		1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00		-	
	Onioids	Biosynthesis	preproenkephalin B/prodynorphin/PDYN	131340	131340 NM_00621120pter-p12:21	Opter-p12:21
Dontido			preproenkephalin			
Hormonal			A/proenkephalin/PENK	131330	131330 NM_006211	8q23-q24
Regulation		Receptors	opioid receptor, kappa 1/OPRK1	165196	165196 NM_000912	8q11.2
of Appetite		Biosynthesis	Biosynthesis Cholecystokinin/CCK	118440	118440 NM_000729	3pter-p21
4	Cholecystoki	p	Cholecystokinin A receptor/CCKAR	118444	118444 NM_0007304p15.2-p15.1	tp15.2-p15.1
	um (CCR)	Keceptors	Cholecystokinin B receptor/CCKBR	118445	118445 NM_000731 1p15.5-p15.4	1p15.5-p15.4
			corticotropin releasing hormone/CRH	122560	122560 NM_000756	8q13
		Biosynthesis	Biosynthesis urocortin/UCN	600945	600945 NM_003353	Chr.2
			urocortin 2/UCN2	604097	AF104118	***
	Adrenocortic		Corticotropin releasing hormone			
	otropic	December	receptor 1/CRHR1	122561	U16273	17q12-q22
	Hormone	Receptors	Corticotropin releasing hormone			
			receptor 2/CRHR2	602034	602034 NM_001883	7p21-p15
		;II:	Corticotropin releasing hormone-			
		Signaling	binding protein/CRHBP	122559	122559 NM_0018825911.2-913.3	5q11.2-q13.3
		Diographhoeic	adenylate cyclase activating			
		Diosymensis	polypeptide 1 (pituitary)/ADCYAP1	102980	102980 NM_001117	18p11
	PACAP		adenylate cyclase activating			
		Receptor	polypeptide 1 (pituitary) receptor type			
			I/ADCYAP1R1	102981	102981 NM_001118	7p14
	Enterostatin	Biosynthesis	enterostatin/colipase, pancreatic/CLPS		120105 NM_001832	6pter-p21.1
	, d	Biosynthesis insulin/INS	insulin/INS	176730	176730 NM 000207	11p15.5
	rasnin	Receptor	insulin receptor/INSR	147670	147670 NM_000208	19p13.2
		-	leptin/LEP	164160	164160 NM_000230	7q31.3
		Biosynthesis	Biosynthesis peroxisome proliferative activated			
			receptor, gamma/PPARG	601487	601487 NM_005037	3p25

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	Receptor	leptin receptor/LEPR	601007	601007 NM_002303	1p31
Leptin		signal transducer and activator of transcription 3/STAT3	102582	NM_00315 0	17q21
	Sionallino	signal 'ransducer ard activator of	601511	NM_00315	17q11.2
	6				
		signal transducer and activator of		NM 00315	
		transcription 6, interleukin-4	601512	3	12q13
		induced/STAT6		•	
TT.	Biosynthesis	Biosynthesis thyrotropin releasing hormone/TRH	275120	275120 NM_007117	3р
Hormone		thyrotropin releasing hormone			
ALC: MICHO	Receptors	receptor/G protein coupled/TRHR	188545	188545 NM_003301	8q23
·	Biosynthesis	paired box gene 6/PAX6	106210	NM_00028 0	11p13
		preproglucagon/GCG	138030	138030 NM_002054	2q36-q37
Glucagon		glucagon receptor/GCGR	138033	138033 NM_000160	17q25
	Receptor	glucagon-like peptide 1	138032	138032 NM_002062	6p21
		glucagon-like peptide 2	603659	603659 NM_004246	17p13.3
	Biosynthesis	paired box gene 6/PAX6	106210	106210 NM_00028	11p13
Glucagon-		preproglucagon/GCG	138030	138030 NM 002054	2q36-q37
Dolynentides		glucagon-like peptide 1	138032	138032 NM_002062	6p21 [.]
sanudad fio r	Receptors	glucagon-like peptide-2 receptor			
		precursor/GLP2R	603659	AF105367	17p13.3
		somatostatin transcription factor			
		1/STF1/homeodomain transcription			
		factor/insulin promoter factor 1/IPF1	600733	600733 NM_000209	13q12.1
		paired box gene 6/PAX6	106210	NM_00028 0	11p13
		paired box gene 4/PAX4	167413	167413 NM_006193	7q32

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			Homo sapiens paired box gene	167415	167415 NM 003466	2a12-a14
			insulin/INS	176730	176730 NM 000207	1
			neurogenic differentiation	601724	601724 NM_002500	2q32
			cAMP responsive element binding protein 1/CREB1	123810	NM_00437	2q32.3-q34
			lim homeobox transcription factor 1,			
		Dicement		600298	****	1q22-q23
Control of		Biosyntnesis	caudal type homeo box transcription			
Metabolism			factor 2/CDX2	600297	600297 NM 001265	13q12.3
il component			purine-rich element binding protein			
			A/PURA	600473	600473 NM_005859	5q31
			ATP-binding cassette, sub-family C,		NTA DOOSE	
			member 8/ABCC8/sulfonylurea	6002009	CC000_MINI	11p15.1
	•		receptor (hyperinsulinemia)/SUR1			•
	Insulin		ATP-binding cassette, sub-family C (C 601439 NM_005691	601439	NM_005691	12p12.1
			beta-cell inward rectifier			
			subunit/BIR/potassium inwardly-	600037	הפסתפת	11-15-1
			rectifying channel, subfamily J,	156000	D30302	11013.1
			member 11/KCNJ11			
			carboxypeptidase E/CPE	114855	114855 NM_001873	Chr.4
			insulin receptor/INSR	147670	147670 NM_000208	19p13.2
			insulin receptor substrate 1/IRS1	147545	NM_00554 4	2q36
			insulin receptor substrate 2/IRS2	262009	NM_00374 9	13q34
		Receptor	insulin receptor substrate 4/IRS4	603510	NM_00360 4	****
			growth factor receptor-bound protein 10/GRB10	601523	NM_00531 1	7p12-p11.2

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			growth factor receptor-bound protein 2/GRB2	108355	NM_00208 6	17q24-q25
			amylin/diabetes-associated			
		Signaling	peptide/DAP/islet annyloid	147940	NM_00041 5	12p12.3- p12.1
		N. C. L. L. L.				1
		Metabolism		146680	146680 NM_004969	10q23-q25
			uncoupling protein 1 (mitochondrial,	112720		
			proton carrier)/UCP1	06/611	A51953	4q31
į			uncoupling protein 2 (mitochondrial,			
I bermoregul		Uncoupling		601693	AF019409	11913
ation	Proteins	Proteins	uncoupling protein 3 (mitochondrial,			
			proton carrier)/UCP3	602044	602044 NM 003356	11913
			uncoupling protein 4 (mitochondrial,			-
			proton carrier)/UCP4	****	***** NM 004277	****
			somatostatin transcription factor			
			1/STF1/homeodomain transcription			
			factor/insulin promoter factor 1/IPF1	600733	600733 NM 000209	13q12.1
		Biosynthesis	paired box gene 6/PAX6	106210	NM_00028 0	11p13
			cAMP responsive element binding	172010	NM_00437	2000
	-		protein 1/CREB1		6	2952.3-934
	Somatostatin		somatostatin/SST	182450	182450 NM 001048	3928
			preprocortistatin/CORT	602784	602784 NM_001302	1p36
			Somatostatin receptor 1/G protein-			
			coupled/SSTR1	182451	182451 NM 001049	14q13
			Somatostatin receptor 2SSTR2	182452	182452 NM 001050	17q24
		Receptors	Somatostatin receptor 3/adenyl cyclase			
			coupled/SSTR3	182453	182453 NM 001051	22q13.1
	<u> </u>		Somatostatin receptor 4/SSTR4	182454	182454 NM_001052	20p11.2

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		Somatostatin recentor 5/SCTR 5	182455	182455 NIM 001053	16,12,2
				10100 Till	1
		growth hormone releasing			
	Снвн	hormone/GHRH	139190	AH002712	20q11.2
Growth	Grindi	growth hormone releasing hormone			
Hormone		receptor/G protein-coupled/GHRHR	139191	139191 NM_000823	7p15-p14
	Growth	growth hormone 1/somatotropin/GH1	139250	139250 NM_000515	` `
	Hormone	growth hormone receptor/GHR	600946	600946 NM_000163	5p13-p12
		insulin-like growth factor 1	077271	*******	12q22-
	Riocynthesic		14/440	M27544	q24.1
	Losymenesus	insulin-like growth factor 2			
		(somatomedin A)/IGF2	147470	147470 NM 000612	11p15.5
		insulin-like growth factor 1 receptor			
	Recentor	precursor/IGF1R	147370	147370 NM_000875	15q25-q26
	Tord and	insulin-like growth factor 2			ı
		receptor/IGF2R	147280	147280 NM_000876	6q26
Insulin-Like		insulin-like growth factor binding prote 146730 NM_000596	146730	965000 MN	7p14-p12
Growth	•	insulin-like growth factor binding prote 146731	146731	M35410	2933-934
Factor		insulin-like growth factor binding prote 146732 NM_000598	146732	NM_000598	7p14-p12
		insulin-like growth factor binding prote 146733	146733	Y12508	17q12-q21
	Regulation	insulin-like growth factor binding prote 146734	146734	AF055033	2q33-q36
		insulin-like growth factor binding prote 146735	146735	M69054	12q13
		insulin-like growth factor binding prote 602867 NM_001553	602867	NM_001553	4q12
		connective tissue growth factor/CTGF/ 121009 NM_001901	121009	NM_001901	6q23.1
		insulin-like growth factor binding prote 602369 NM_001554	602369	VIM_001554	1p22.3
		insulin-like growth factor binding prote 601489 NM_004970	601489	NM_004970	Chr. 16
-	Cotobolism				
	Catabonsin		602194	602194 NM_002775 0q25.3-q26.2	0q25.3-q26.2
		heparin-binding growth factor 1/FGF1 131220 NM_000800	131220	MM_000800	5q31
		basic fibroblast growth factor/FGF2	134920	134920 NM 002006	4q25-q27

·		1 10 1700 1111 000 111		CThII
·	HST oncogene/tibroblast growth			
	factor 4/FGF4	164980	164980 NM_002008	11913
	fibroblast growth factor-related			
	protein/FGF5	165190	165190 NM_004464	4q21
	fibroblast growth factor 6/FGF6	134921	X57075	12p13
	keratinocyte growth factor/fibroblast			
	growth factor 7/FGF7	148180	148180 NM_002009 15915-921.1	15q15-q21.
	fibroblast growth factor 8 (androgen-			
Biosynthesis	induced)/FGF8	600483	600483 NM_006119	10q24
	fibroblast growth factor 9 (glia-			
	activating factor)/FGF9	600921	600921 NM_002010	13q11-q12
	fibroblast growth factor 10/FGF10	602115	602115 NM_004465	5p13-p12
•	fibroblast growth factor 11/FGF11	601514	601514 NM_004112	17q21
	fibroblast growth factor 12/FGF12	601513	****	3q28
-	fibroblast growth factor 13/FGF13	300070 ₪	300070 NM_004114	Xq26.3
	fibroblast growth factor 14/FGF14	601515	601515 NM_004115	13q34
	fibroblast growth factor 16/FGF16	603724	603724 NM_003868	*****
Fibroblast	fibroblast growth factor 17/FGF17	603725	603725 NM_003867	8p21
Growth	fibroblast growth factor 18/FGF18	603726	603726 NM_003862	*****
Factor	fibroblast growth factor 19/FGF19	603891 N	603891 NM 005117	*****
	fibroblast growth factor receptor			8p11.2-
	1/FGFR1	136350	****	p11.1
	fibroblast growth factor receptor 2			
	(bacteria-expressed kinase,			
	keratinocyte growth factor receptor,			
	craniofacial dysostosis 1, Crouzon			
Receptors	syndrome, Pfeiffer syndrome, Jackson-		NM_00014	
-	Weiss syndrome)/FGFR2	176943	-	10q26

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			fibroblast growth factor receptor 3			
			(achondroplasia, thanatophoric		NM 00524	
			dwarfism)/FGFR3	134934	,	4p16.3
			fibroblast growth factor receptor		NM 00201	
			4/FGFR4	134935	,	5q35.1-qter
			FGFR1 oncogene partner/FOP	****	NM_007045	****
_			suc1-associated neurotrophic factor			
			target 1 (FGFR signalling			
		Signaling	adaptor)/SNT1	****	***** NM 006654	****
			suc1-associated neurotrophic factor			
			target 2 (FGFR signalling			
			adaptor)/SNT2	****	***** NM_006653	****
			sonic hedgehog (Drosophila)			
General	. oinos	Riosynthesis		600725	600725 NM_000193	7q36
Growth	Hedgehog					
Control	90009001	 	homolog/IHH.	600726	L38517	2q33-q35
		Receptors	patched (Drosophila) homolog/PTCH	601309	601309 NM_000264	9q22.3
			nerve growth factor, alpha			
			subunit/NGFA	162020	****	***
	Nerve	Biosynthesis	Biosynthesis nerve growth factor; beta	162030	****	1p13.1
	Growth		nerve growth factor; gamma			
	Factor		subunit/NGFG	162040	****	19913.3
		Decentors	nerve growth factor receptor (TNFR			
		eroidaaa	superfamily, member 16)/NGFR	162010	162010 NM 002507	17q21-q22
			neurotrophin 3/NTF3	162660	162660 NM_002527	12p13
-			neurotrophin 5 (neurotrophin	162662	162662 NM_006179	19q13.3
		Biosynthesis	neurotrophin 6, alpha/NTF6A	604021	604021 NM 004149	19913.3
			neurotrophin 6, beta/NTF6B	604022	604022 NM 004150	19q13.3
	Nouroteanhi		neurotrophin 6, gamma/NTF6G	604023	604023 NM 004151	19q13.3

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211		type 1/NTRK1	191315	Y09033	1q21-q22
	Docontors	neurotrophic tyrosine kinase receptor			
	receptors	type 2/NTRK2	600456	600456 NM_006180	9q22.1
		neurotrophic tyrosine kinase receptor			
		type 3/NTRK3	191316	191316 NM_002530	15925
		phosphatidylinositol 3-kinase,			
		regulatory subunit, polypeptide 1 (p85, 171833	171833	M61906	5q13
		alpha)/PIK3R1			
		phosphatidylinositol 3-kinase,		COSOO FEE	0.01
		regulatory subunit, polypeptide 2 (p85, 603157	603157	70000_MINI	19915.2- 013.4
		beta)/PIK3K2			4.2.1
		phosphatidylinositol 3-kinase,		C2000 FAIX	
•	Phosphatidyl	Phosphatidyl regulatory subunit, polypeptide 3 (p55, ***** IVIN UU302	****	MM_00362	****
	Inositol	gamma)/PIK3R3		ע	
	Kinases	phosphoinositide-3-kinase, catalytic,	171074	NM 00621	
		alpha polypeptide/PIK3CA	1/1034	1	3926.3
•		phosphoinositide-3-kinase, catalytic,	300003	NM_00621	1 1 1
		beta polypeptide/PIK3CB	002923	6	+++++
;		phosphatidylinositol 3-kinase,	020609	NM_00502	1 2 7 0
		catalytic, delta polypeptide/PIK3CD	00700	9	1p30.2
(1)		phosphatidylinositol 3-kinase,	66103	NM 00264	1 1 1 1
		catalytic, gamma polypeptide/PIK3CG	001727	6	++++
-		son of sevenless (Drosophila)	107570	NM_00563	
		homolog 1/SOS1	162330	n	17d-77d7
		v-Ha-ras Harvey rat sarcoma viral	100020	NM_00534	112166
		oncogene homolog/HRAS	120020	3	11015.5
		v-Ki-ras2 Kirsten rat sarcoma 2 viral	190070	NM_00498	12n12 1
_	KAS/KAF	oncogene homolog/KRAS2	2122	5	1-514-1

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	Mediators	neuroblastoma RAS viral (v-ras)	164790	NM_00252	1013.2.
		oncogene homolog/NRAS		4	1.3.4.
		Ras-related associated with	179503	NM_00416	16022
		diabetes/RRAD	117000	5	==\bar{\pi}
		v-raf-1 murine leukemia viral	164760	NM_00288	3275
		oncogene homolog 1/RAF1	104/00	0	czyc
		mitogen activated protein kinase	176048	NM_00274	224112
		PRKM1/MAPK1	1/0240	5	7.11h77
		mitogen activated protein kinase	601795	X60188	16p11.2
Hormone Signalling		mitogen activated protein kinase	176949	NM_00274	18q12-q21
•		mitogen activated protein kinase PRKM6/MAPK6	602904	NM_00274 8	* * * * * *
		mitogen activated protein kinase PRKM7/MAPK7	602521	NM_00274 9	17p11.2
	Protein	mitogen activated protein kinase JNK I/PRKM8/MAPK8	601158	L26318	**
	Kinases	mitogen activated protein kinase JNK2/PRKM9/MAPK9	602896	U09759	5q35
		mitogen activated protein kinase JNK3/PRKM10/MAPK10	602897	U35003	* * * * *
		mitogen activated protein kinase PRKM11/MAPK11	602898	AF031135	* * * *
. •		mitogen activated protein kinase SAPK3/MAPK12	602399	NM_00296 9	22q13.3
		mitogen activated protein kinase PRKM13/MAPK13	602899	NM_00275 4	* * * *
		mitogen activated protein kinase SAPK2A/MAPK14	600289	600289 NM_00131	6p21.3- p21.2

			protein tyrosine phosphatase, non- receptor type 1/PTPN1	176885	NM_00282 7	20q13.1- q13.2
			protein tyrosine phosphatase, receptor type, F/PTPRF	179590	NM_00284 0	1p32
		Protein	protein phosphatase 1, catalytic subunit, alpha isoform/PPP1CA	176875	NM_00270 8	11913
		r nospinatase S	phogrin/IAR/receptor-like protein-tyrosine phosphatase precursor/IAR	601698	AF007555	7q36
			protein tyrosine phosphatase, receptor type, N/PTPRN	601773	NM_00284 6	2q35-q36.1
			protein phosphatase 1, regulatory (inhibitor) subunit 2/PP1R2	601792	NM_00624 1	3q29
	-	Other	insulin induced gene 1/INSIG1	602055	NM_00554 2	7q36
			pyruvate carboxylase/PC	266150	NM_00092 0	11q13.4- q13.5
			phosphoenolpyruvate carboxykinase 1 (soluble)/PEPCK1//PCK1	261680	NM_00259 1	20q13.31
		Gluconeogen	phosphoenolpyruvate carboxykinase 2 (mitochondrial)/PEPCK2/PCK2	261650	NM_00456 3	* * * *
- <u> </u>		212	aminomethyltransferase (glycine cleavage system protein T)/AMT	238310	NM_00048 1	3p21.2- p21.1
			decarboxylating; glycine decarboxylase, glycine cleavage	238300	NM_00017 0	9p22
			glycogenin/GYG	603942	NM_00413 0	3q24-q25.1
		Glycogen	glycogenin 2/GYG2	300198	NM_00391 8	Xp22.3

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D	glycogen synthase 1 (muscle)/GYS1	138570	138570 NM_00210	19q13.3
	glycogen synthase 1 (liver)/GYS2	138571	AJ003087	12p12.2
	(muscle), muscle	311870	NM_00263 7	Xq13
	phosphorylase kinase, alpha 2 (liver),	306000	MN	
	phosphorylase kinase heta/PHKR	172400	2 p22.1	p22.1
	phosphorylase kinase, gamma 2 (testis) 172471 NM 000294 6p12.1-p11.2	172471	NM 000294	6p12.1-p11.
	protein phosphatase 1, regulatory			
	sarcoplasmic reticulum binding	600917	600917 NM_00271	** ** *
	subunit, skeletal muscle)/PPIR3			
Regulation	albumin proximal factor/transcription factor 1/TCF1/hepatic nuclear	142410	142410 NM_00054	12024.2
of Glycogen	factor/HNF1		ς.	
Metabolism	transcription factor 2/TCF2/hepatic nuclear factor 2/HNF2	189907	189907 NM_00648	17cen-q21.3
	hepatocyte nuclear factor 3, alpha/HNF3A	602294	NM_00449 6	14q12-q13
	hepatocyte nuclear factor-3 beta/HNF3B	600288	AF176110	20p11
	hepatocyte nuclear factor 3, gamma/HNF3G	602295	602295 NM_00449	19q13.2- q13.4
	hepatocyte nuclear factor 4, alpha/HNF4A	600281	NM_00045	20q12- q13.1
	hepatocyte nuclear factor 6/HNF6	604164	AH007195	15q21.1- q21.2

			nisuiin-regulated syntaxin 4 binding protein/SYNIP	* * * *	* * * *	* * *
			grucose-o-pnospnatase, uansport (glucose-6-phosphate) protein 1	602671	NM_00146	11q23
	Metabolism		Solute carrier family 5, member 1/SLC5A1/SGLT1 (glucose)	182380	AH005284	22q13.1
		Uptake	Solute carrier family 2 (facilitated glucose transporter), member 1/SLC2A1/GLUT1 (glucose)	138140	NM_00651 6	1p35-p31.3
			Solute carrier family 2, member 2/SLC2A2/GLUT2 (glucose)	138160	**	3q26.1- q26.3
			Solute carrier family 2, member 3/SLC2A3/GLUT3 (glucose)	138170	M20681	12p13.3
			Solute carrier family 2, member 4/SLC2A4/GLUT4 (glucose)	138190	NM_00104	17p13
Carbohydrat e		·	Solute carrier family 2, member 5/SLC2A5/GLUT5 (glucose)	138230	NM_00303	1p36.2
Metabolism			phosphorylase, glycogen; muscle		NPA 00550	
and Storage			(McArdle syndrome, glycogen storage disease type V)/PYGM	232600	232600 11111 00360	11913
			phosphorylase, glycogen; liver (Hers disease, glycogen storage disease type VI)/PYGL	232700	232700 NM_00286	14q21-q22
		Glycogen Breakdown	phosphorylase, glycogen; brain, nuclear gene encoding mitochondrial protein/PYGB	138550	138550 NM_00286	20p11.2- p11.1
			disease, glycogen storage disease type	232300	232300 NM_00015	17q25.2- q25.3

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		amylo-1,6-glucosidase, 4-alpha-glucanotransferase (glycogen debranching enzyme, glycogen storage disease type III)/AGL		232400 NM_00064	1p21
		hexokinase 2, nuclear gene encoding mitochondrial protein/HK2	601125	NM_00018 9	2p12
		glucokinase (hexokinase 4, maturity onset diabetes of the young 2) nuclear gene encoding mitochondrial protein/GCK	138079	138079 NM_00016	7p15-p13
		phosphofructokinase, muscle/PFKM	232800	NM_00028 9	12q13.3
		pyruvate kinase, muscle/PKM2	179050	179050 NM_002654	15q22
•		pyruvate kinase, liver/PKL	****	D13243	****
	Glycolysis	pyruvate dehydrogenase (lipoamide) alpha 1/PDHA1	312170	312170 NM_00028	Xp22.2- p22.1
		pyruvate dehydrogenase (lipoamide) al	179061	NM_00539 0	4q22-q23
		pyruvate dehydrogenase (lipoamide) be 179060 S	179060	NM_00092 5	3p13-q23
		pyruvate dehydrogenase dihydrolipoam	246900	246900 NM_00010	7q31-q32
		pyruvate dehydrogenase lipoyl-contain	245349	NM_00347 7	11p13
		beta-galactosidase/GLB1	230500	M22590	3p21.33
		cathepsin A/CSTA/protective protein			
		for beta-galactosidase			
		(galactosialidosis)/PPGB	256540	256540 NM 000308	20q13.1

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			amyloid precursor protein			
			secretase/cathepsin B/CTSB	116810	116810 NM_001908	8p22.
			dipeptidyl-peptidase I/DPP1/cathepsin			
			C/CTSC	602365	NM_001814	602365 NM_001814 1q14.1-q14.3
			cathepsin D (lysosomal aspartyl			
			protease)/CTSD	116840	116840 NM_001909	11p15.5
	Clycolytic		cathepsin E/CTSE	116890	116890 NM 001910	1931
	(and Other)	Lysosomal	cathepsin F/CTSF	603239	AF132894	11913
	Protein	Targeting of	cathepsin G/CTSG	116830	116830 NM_001911	14q11.2
	Maturation	Glycolytic				
	and	Enzymes	2/CSTGL2	116831		14q11.2
	Targeting		cathepsin H/CTSH	116820	116820 NM_004390	15q24-q25
	0		cathepsin K (pycnodysostosis)/CTSK	601105	601105 NM 000396	
	ē		cathepsin L/CTSL	116880	116880 NM_001912	9q21-q22
			cathepsin L2/CTSL2	****	***** NM 001333	****
			cathepsin O/CTSO	600550	600550 NM_001334	4q31-q32
			cathepsin S/CTSS	116845	116845 NM_004079	1921
			cathepsin U/CTSU	***	AF070448	****
			cathepsin V/CTSV	****	AB001928	****
			cathepsin W/CTSW	602364	602364 NM 001335	11913.1
			cathepsin X precursor/CSTX	****	AF073890	****
			cathepsin Z/CTSZ	603169	603169 NM_001336	20q13
			mannosyltransferase polypeptide 1	603503	NM_00385	***
			acticitys prospitate and		70000	
			mannosyltransferase polypeptide 2	603564	NM_00386	***
			dolichyl-phosphate (UDP-N-			
			acetylglucosamine) N-	101250	101350 NM_00138	11,000
			acetylglucosaminephosphotransferase	000101	2	11425.5
			1 (GlcNAc-1-P transferase)/DPAGT1			

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		aldose reductase/aldo-keto reductase family 1, member A1 (aldehyde reductase)/AKR1A1	103880	NM_00606	7q35
Protein Glycosylatio	Sugar and	sorbitol dehydrogenase/SORD	182500	NM_00310 4	15q15.3
n (enzymatic and non-	Transition Metal	glutamine-fructose-6-phosphate transaminase 1/GFPT1	138292	NM_00205 6	2p13
enzymatic)	Metabolism	glutamine-fructose-6-phosphate transaminase 2/GFPT2	603865	NM_00511 0	5q34-q35
		receptor for advanced glycation end products/RAGE/AGER	600214	AJ133822	6p21.3
		glutamate-cysteine ligase (gamma- glutamylcysteine synthetase), catalytic (72.8kD)/GLCLC	230450	230450 NM_00149	6p12
		glutathione synthetase/GSS	601002	NM_00017 8	20q11.2
		ATP-binding cassette 7 (iron transporter)/ABCB7	300135	NM_00429 9	Xq13.1- q13.3
		transferrin/TF	000061	NM_00106	3q21
		hepatocyte growth factor/HGF	142409	142409 G_HUMHG	7q21.1
			0,01,01	NM_00024	
		vascular endothelial growth	164860	5	7q31
		factorVEGFA	192240	1VIM 00337	6p12
		vascular endothelial growth		NM_00337	
		vaccular and otholical constant	901398	/	11913
		factor/VEGFC	601528	NM_00542	***
		VEGF receptor/VEGFR	191306	191306 AF063657	4q12

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		growth hormone/GH1	139250	139250 NM 000515 17q22-q24	17q22-q24
		growth hormone receptor/GHR	600946	600946 NM_000163	5p13-p12
		pigment epithelium-derived	172860	172860 NM 002615	17p13.3
		angiostatin/plasminogen/PLG	173350	173350 NM 000301	6q26
		endostatin/type XVIII			
		collagen/COL18A1	120328	AF018081	21q22.3
		endothelin 1/EDN1.	131240	131240 NM_001955	6p24-p23
		endothelin 2/EDN2	131241	131241 NM 001956	1p34
		endothelin 3/EDN3	131242	131242 NM_00011420q13.2-q13.	.0q13.2-q13.
		endothelin A receptor isoform delta			
	Vascular	3/EDNRA	131243	AF014826	Chr.4
Neovasculari	Growth	endothelin receptor type B/EDNRB	131244	131244 NM_000115	13q22
zation	Factors and	protein kinase C beta/PRKCB	176970	X06318	16p11.2
	Inhibitors	transforming growth factor, beta-			
		1/TGFB1	190180	M60315	9q13.1-q13.2
		transforming growth factor, beta-			
		2/TGFB2	190220	190220 NM_003238	1941
		transforming growth factor, beta-			
		3/TGFB3	190230	190230 NM 003239	14q24
		transforming growth factor, beta		NIN 00461	
		receptor I (activin A receptor type II-	190181	10401	9933-934
		like kinase, 53kD)/TGFBR1		7	•
		transforming growth factor, beta	100102	NM_00324	2.22
		receptor II (70-80kD)/TGFBR2	701061	2	77dc
		mansioning grown lactor, octa		NM 00324	
		receptor III (betaglycan,	600742	3	1p33-p32
		decorin/DCN	125255	125255 NM_001920	12q23
		Munc13	*****	AF020202	****

			transient receptor potential channel 3			
	•		(diacylglycerol-activated non-selective			
	• •		cation channel)/TRPC3		602345 NM 003305	***
			transient receptor potential channel 6			
	.:		(diacylglycerol-activated non-selective			
			cation channel)/TRPC6	_	603652 NM_004621	11q21-q22
			solute carrier family 12, member			
		Ion Pump	3/SLC12A3 (renal sodium/chloride			
			transporter)	896009	600968 NM_000339	16q13
Hyperglycem			renin/REN	179820	179820 NM 000537	Xq28
ic Stress			renin-binding protein/RENBP	312420	312420 NM_002910	1q32
(hypoxia,	•		angiotensinogen/AGT	106150	106150 NM_000029	1q42-q43
vascular			angiotensin II type 1 receptor/AGTR1	106165	M87290	3q21-q25
endothelium	•.	Angiotensin	guanine nucleotide binding protein (G			
thickening,			protein), beta polypeptide 3/GNB3	139130	139130 NM 002075	12p13
and	•		dipeptidyl carboxypeptidase 1			
hypertension)	•		(angiotensin I converting			
	· ·		enzyme)/ACE/DCP1	106180	106180 NM 000789	17q23
	•		atrial natriuretic peptide precursor			
			ANPPA	108780	X01471	1p36.2
	•		atrial natriuretic peptide precursor			
			B/NPPB	600295	****	1p36.2
			atrial natriuretic peptide precursor			
		Natriuretic	C/NPPC	600296	D28874	2q24-qter
	•	Peptide	natriuretic peptide receptor			
			A/ANPRA/NPR1	108960	***	1q21-q22
			natriuretic peptide receptor			
			B/ANPRB/NPR2	108961	***	9p21-p12

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		natriuretic peptide receptor			
		C/ANPRC/NPR3	108962	108962 NM_000908	5p14-p12
		endothelin 1/EDN1	131240	131240 NM_001955	6p24-p23
,		endothélin 2/EDN2	131241	131241 NM_001956	1p34
		endothelin 3/EDN3	131242	131242 NM_0001140q13.2-q13	20q13.2-q13.
	Endothelin	endothelin converting enzyme 1/ECE1		600423 NM_001397	1p36.1
		endothelin A receptor isoform delta			
		3/EDNRA	131243	AF014826	Chr.4
Drocento		endothelin receptor type B/EDNRB	131244	131244 NM_000115	13q22
Regulation	-	arginine vasopressin (neurophysin II,			
Cadditional		antidiuretic hormone, diabetes			
genes in		insipidus, neurohypophyseal)/AVP	192340	192340 NM_000490	20p13
Cardiovascul		arginine vasopressin receptor			
ar and	Vocoprocein	1A/AVPR1A	600821	600821 NM_000706 12q14-q15	12q14-q15
Renal	r asopi essin	arginine vasopressin receptor			
		1B/AVPR1B	600264	600264 NM_000707	1q32
		arginine vasopressin receptor 2			
,		(nephrogenic diabetes	304800	304800 NM_000054	Xq28
		leucyl/cystinyl	151300	151300 NM_005575	****
		nitric oxide synthetase 1/NOS1	163731	AH001515	AH001515 bq24.2-q24.3
		nitric oxide synthetase 2A/NOS2A	163730	X85766	17cen-q11.2
	Nitric Oxide	Nitric Oxide macrophage nitric oxide synthetase			
	Pathway	2B/NOS2B	600719	AH006623	17p13.1-q25
	(additional	macrophage nitric oxide synthetase			
-	Genes in	2C/NOS2C	600720	600720	17p13.1-q25
	Cardiovascul	nitric oxide synthetase 3/NOS3	163729	AH001515	7q36
	ar and	chondrocyte nitric oxide synthetase			
	Renal)	3/NOS4 ;	163728	X73029	****
•		arginase/ARG1	207800	207800 NM_000045	****
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		arginase/ARG2	107830	NM_001172	107830 NM_001172 4924.1-924.3
		ATP sensitive potassium inwardly-rectifying channel, subfamily J, member 5/KCNJ5	600734	NM_00089	11924
	٠	transient receptor potential channel 3 (diacylglycerol-activated non-selective			
		cation channel)/TRPC3	602345	602345 NM_003305	***
	ľ	transient receptor potential channel 6			
	Channele	(diacylglycerol-activated non-selective			
	Chamicis	cation channel)/TRPC6	603652	603652 NM_004621	11q21-q22
		potassium large conductance calcium-			
		activated channel, subfamily M, alpha			
		member 1/KCNMA1	600150	600150 NM_002247	10q22
		potassium large conductance calcium-			
		activated channel, subfamily M, beta			
		member 1/KCNMB1	603951	603951 NM_004137	5q34
	•	superoxide dismutase 1/SOD1	147450	147450 NM_000454	21q22.1
	•	superoxide dismutase 2, mitochondrial 147460	147460	X65965	6q25.3
		glutamate-cysteine ligase (gamma-		NTM 00140	
		glutamylcysteine synthetase), catalytic 230450 1111	230450	8	6p12
				NPA 00017	
		glutathione synthetase/GSS	601002	/ 1000 WIN	20q11.2
	Antiovidente	catalase/CAT	115500	115500 NM_001752	11p13
Amelioration	Antiovilants				
of Oxidative	Radical	glutathione peroxidase 1/GPX1	138320	AF029317	3p21.3
Stress	Scavengers	glutathione peroxidase 2	170710	NM_00208	
		(gastrointestinal)/GFA2	138319	າ —	14924.1:

		glutathione peroxidase 3		NM 00208	
		(plasma)/GPX3	138321	۱ 4	5q32-q33.1
	·	glutathione peroxidase 4		NM 00208	
		(phospholipid hydroperoxidase)/GPX4	138322	ري ا	19p13.3
		glutathione peroxidase 5 (epididymal		NM_00150	
	~	androgen-related protein)/GPX5	603435	6	****
		apolipoprotein (a), Lp(a)/LPA	152200	152200 NM_005577	6q27
		RBP5/cellular retinoic acid-binding			
		protein 1/CRABP1	180230	180230 NM_004378	15q24
		cellular retinoic acid-binding protein			
		2/CRABP2	180231	180231 NM_001878	1921.3
		retinol-binding protein 1,	180260	180260 NM_002899	3q21-q22
		retinol-binding protein 2,	180280	180280 NM_004164	3q21-qter
		retinol-binding protein 3,			
	Transport		180290	180290 NM_002900	10q11.2
		retinol-binding protein 4,			
	_	interstitial/RBP4	180250	180250 NM 006744	10q24
	-	serum vitamin D-binding			
		protein/DBP/group-specific			
		component/GC	139200	L10641	4q12
		transthyretin (prealbumin, amyloidosis type 1)/TTR	176300	NM_00037	18q11.2-
3		Retinoic acid receptor, alpha/RARA	180240	NM_00096	
		Retinoic acid recentor. heta/RARB	180220	96000 WN	3n74
				5	- pp-
		Retinoic acid receptor, gamma/RARG 180190 NM_00096 6	180190	96000 MN 6	12q13

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		Retinoid X receptor alpha/RXRA	180245	NM_00569	9q34.3
finoids		Retinoid X receptor beta/RXRB	180246	X66424	6p21.3
	Receptors	Retinoid X receptor gamma/RXRG	180247	U38480	1q22-q23
	and RAR-rela Coactivators A/RORA	RAR-related orphan receptor	600825	NM_00294	15q21-q22
		RAR-related orphan receptor B/RORB 601972	601972	****	15q21-q22
		RAR-related orphan receptor C/RORC 602943	602943	0 0806 0	1921
		nuclear receptor coactivator 2/GRIP1	601993	601993 NM 006540	****
		silencing mediator for retinoid and thyroid homone receptors/SMRT	600848	600848 NM 006312	****
		retinoic and thyroid hormone receptor			
•		associated corepressor			
		1/TRAC1/NCOR1	600849	600849 NM_006311	****
		UDP glycosyltransferase 1/UGT1	191740	191740 NM_00107	Chr. 12
		UDP glycosyltransferase family 2, member B4/UGT2B4	290009	600067 NM_00107	4q13
	Catabolism	UDP glycosyltransferase family 2, member B7/UGT2B7	890009	NM_00107 4	1914
		UDP glycosyltransferase 2 family, polypeptide B11/UGT2B11	603064	NM_00107	**
		UDP glycosyltransferase family 2, member B15/UGT2B15	690009	NM_00107 6	4q13
		UDP glycosyltransferase family 2, member B17/UGT2B17	601903	NM_00107 7	1914
		Peroxisome proliferative activated receptor, alpha/PPARA	170998	NM_00503 6	22q12- q13.1

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			refoxisome promeranve acuvated	L	C7000_MINI	1921.3
			receptor, delta/PPARD	00+40	8	
			peroxisome proliferative activated			
			receptor, gamma/PPARG	601487	601487 NM_005037	3p25
	Dorovisomo	Receptors	CCAAT/enhancer binding protein	116897	NM_00436	19q13.1
		and	_			
		Coactivators		189965	189965 NM_005194	20q13.1
			CCAAT/enhancer binding protein (C/EBP), gamma/CEBPG	138972	08100 MN 6	Chr. 19
v			CCAAT/enhancer binding protein	116898	NM_00519	8p11.2-
			CCAAT/enhancer binding protein (C/EBP), epsilon/CEBPE	600749	NM_00180	14q11.2
			acetyl-Coenzyme A carboxylase alpha/ACACA	200350	NM_00066 4	17q21
			acetyl-Coenzyme A carboxylase beta/ACACB	601557	NM_00109	12q24.1
		·	acetyl-Coenzyme A acetyltransferase I (acetoacetyl Coenzyme A thiolase)/ACA'I'l	203750	0000 MN	11q22.3- q23.1
		Biosynthesis	acetyl-Coenzyme A acetyltransferase 2 (acetoacetyl Coenzyme A thiolase)/ACAT2	100678	NM_00589	6q25.3-q26
			ATP citrate lyase/ACLY	108728	NM_00109 6	17921.1
			glycerol-3-phosphate acyltransferase, mitochondrial/GPAM1	602395	****	10q24-q26
	,		fatty acid synthase/FASN	600212	NM_00410 4	17q25
•	•			•	•	

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	apolipoprotein A1 of HDL/APOA1	107680	107680 NM_000039	11423
	apolipoprotein A2/APOA2	029201	107670 NM_001643	1921-923
	apolipoprotein A4/APOA4	107690	107690 NM_000482	11923
	apolipoprotein B (including Ag(x)			
	antigen)/APOB	107730	107730 NM_000384	2p24
	apolipoprotein B mRNA editing			
	enzyme, catalytic polypeptide	600130	600130 NM_005889	12p13.1
	APOBEC1 binding			
	protein/ABBP1/heterogeneous nuclear			-
	ribonucleoprotein A/B/HNRPAB	602688	602688 NM_004499	****
Transport	apolipoprotein C1/APOC1	107710	107710 NM_001645	19q13.2
	apolipoprotein C2/APOC2	207750	207750 NM_000483	19q13.2
	apolipoprotein C3/APOC3	107720	107720 NM_000040	11923
	apolipoprotein C4/APOC4	600745	600745 NM_001646	19q13.2
	apolipoprotein D/APOD	107740	107740 NM_001647 3q26.2-qter	3q26.2-qter
	apolipoprotein E/APOE	107741	107741 NM_000041	19q13.2
	apolipoprotein F/APOF	107760	107760 NM_001638	Chr.12
	apolipoprotein H (beta-2-glycoprotein			
	І)/АРОН	138700	138700 NM_000042	17q23-qter
	apolipoprotein J/clustrin/APOJ/CLU	185430	185430 NM 001831	8p21-p12
	apolipoprotein L/APOL	603743	AF019225	Chr. 22
	pancreatic triglyceride lipase/PNLIP	246600	AH003527	10q26.1
	enterostatin/colipase, pancreatic/CLPS	120105	120105 NM_001832 6pter-p21.1	6pter-p21.1
	(familial hypercholesterolemia)/LDLR	143890	143890 NM 000527 9p13.2-p13.1	9p13.2-p13.
	low density lipoprotein receptor-			
	related protein 1/LRP1	107770	107770 NM_002332 2q13.1-q13.3	2q13.1-q13.
	low density lipoprotein receptor-			
	related protein 2/LRP2	600073	U33837	2q24-q31

			1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			
			related protein 5/LRP5	603506	AF077820	110134
			low density lipoprotein recentor-		070110 11:	t.C1P1.
		Tintaire	related protein 8/LRP8	602600	602600 NM 004631	1n34
		Optane	low density lipoprotein receptor-			
			related protein-associated protein	104225	104225 NM 002337	4016.3
			oxidized low density lipoprotein			
			receptor/OLR1	602601	602601 NM 002543 12p13-p12	12p13-p12
			very low density lipoprotein			
			receptor/VLDLR	192977	192977 NM 003383	9p24
775			microsomal triglyceride transfer			
Linid	Linid		protein large subunit/MTP	157147	157147 NM 000253	4q22-q24
E	Metabolism		sortilin related receptor/SORL1	602005	602005 NM 003105 1923.2-024.7	1023.2-024
	d Storage		plasma cholesterol ester transfer			
_	a Dioi age		protein/CETP	118470	118470 NIM 000078	16921
			phospholipid transfer protein/PLTP	172425	172425 NM 006227 20q12-q13.1	20q12-q13.1
		Storage	glycerol-3-phosphate acyltransferase,			
		Storage	mitochondrial/GPAM1	602395	****	10q24-q26
	•		lipoprotein lipase/LPL	238600	238600 NM 000237	8p22
			lipase, hepatic/LIPC	151670	NM_00023 6	15q21-q23
			adrenergic, beta-3-, receptor/ADRB3	109601	109691 NM_000025 8p12-p11.2	8p12-p11.2
		Release	lysosomal acid lipase/LIPB	278000	278000 NM 000235 10q24-q25	10q24-q25
			lipase, hormone-sensitive/LIPE	151750	151750 NM 005357 9q13.1-q13.	9q13.1-q13.
			perilipin/PL/N	170290	170290 NM 002666	15926
			fatty acid binding protein 4,			
	. **		adipocyte/FABP4	600434	600434 NM 001442	8q21
			Fatty acid CoA Ligase, long chain 1/FACL1	152425	* * * * *	3q13

	Fatty acid CoA Ligase, long chain 2/FACL2	152426	***	4q34-q35
Coenzyme A Ligases	Coenzyme A Fatty acid CoA Ligase, long chain Ligases 3/FACL3	602371	NM_00445	2q34-q35
	Fatty acid CoA Ligase, long chain 4/FACL4	300157	NM_00445	Xq22.3
·	Fatty acid CoA Ligase, very long chain 1/FACVL1	603247	NM_00364 5	15921.2
	acyl-Coenzyme A dehydrogenase, long 201460 NM_001608	201460	NM_001608	2q34-q35
	acyl-Coenzyme A dehydrogenase, C-4 201450 NM_000016	201450	NM_000016	1p31
*1	acyl-Coenzyme A dehydrogenase, C-2	201470	201470 NM 000017	12q22-qter
	carnitine palmitoyltransferase I, liver,			
	nucleat gene encoding mitochondrial protein/CPT1A	600528	600528 NM 001876	11013
	carnitine palmitoyltransferase II,			
	nuclear gene encoding mitochondrial			
-	protein/CPT2	600650	600650 NM 000098	1p32
	carnitine/acylcarnitine	212138	212138 NM 000387	3p21.31
	Enoyl-CoA, hydratase/3-hydroxyacyl	261515	96100_MM	3927
	CON ucityulogellase/EnnADn		0	1
	hydroxyacyl-CoA dehydrogenase/3-		MM 00018	
	ketoacyl-CoA thiolase/enoyl-CoA hydratase, alpha subunit/HADHA	068009	2	2p23
	hydroxyacyl-CoA dehydrogenase/3-		01000	
8-Oxidation	ketoacyl-CoA thiolase/enoyl-CoA	143450	NIM 00018	2p23
	hydratase, beta subunit/HADHB		n	
	acyl-Coenzyme A oxidase 1/ACOX1 (peroxisomal)	264470	NM_00403	17925
	acyl-Coenzyme A oxidase 2 branched		NM 00350	
	chain/ACOX2 (peroxisomal)	601641	0	3p14.3

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			acyl-Coenzyme A dehydrogenase, C-2 to C-3 sho.t chain precursor/ACADS (mitochondrial)	201470	201470 NM_00001	12q22-qter
			acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain/ACADM (mitochondrial)	201450	201450 NM_00001 6	1p31
			acyl-Coenzyme A dehydrogenase, long chain/ACADL (mitochondrial)	201460	NM_00160 8	2q34-q35
			hydroxyacyl-Coenzyme A dehydrogenase, type IVHADH2	602057	NM_00449	****
			enoyl-Coenzyme A hydratase 1/ECH1 (peroxisomal)	969009	NM_00139 8	19q13
		Regulation	calcitonin/calcitonin gene-related pepti 114130 NM 001741 1p15.2-p15.	114130	NM 001741	1p15.2-p15.1
	•	(see also	calcitonin/calcitonin gene-related pepti 114160	114160	X02404	1p15.2-p15.2
		parathyroid	calcitonin receptor/CALCR	114131	114131 NM 001742	7q21.3
		hormone)	calcitonin receptor-like/CALCRL	114190	114190 NM 005795	****
			stamiocalcin/STC1	601185	601185 NM_003155	8p21-p11.2
			sodium-calcium exchanger (isoform Nt 182305		AF128524	2p23-p22
		,	sodium-calcium exchanger (isoform N 601901	601901	***	Chr.14
		Uptake	solute carrier family 12		NIM DOORS	16-16
			(sodium/potassium/chloride	600839	600839 24141 8	13q13- a21.1
			dansporters), member 1/3LC12A1			•
		Efflux	regucalcin (senescence marker protein- 30)/RGN	300212	NM_00468	Xp11.2- q11.2
			bone gamma-carboxyglutamate (gla) protein (osteocalcin)/BGLAP	112260	NM_00071 1	1925-931
	Wetabolism		matrix gamma-carboxyglutamate (gla) protein/MGP/MGLAP	154870	154870 NM_00090	12p13.1- p12.3
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			gamma-glutamyl carboxylase/GGCX	137167	NM_00082 1	2p12
	*		secreted phosphoprotein 1/SPP1/osteon 166490	166490	D14813	4q21-q25
		Calcium Deposition	sialoprotein, bone sialoprotein	147563	NM_00496	4q21-q25
			vitamin D (1,25- dihydroxyvitamin			
			D3) receptor/VDR	601769	601769 NM_000376 12q12-q14	12q12-q14
			core binding factor alphal			
			subunit/CBFA1/runt-related			
			transcription factor 2/osteoblast-	600211	AH005498	6p21
			osteonectin/ON/secreted protein,	100100	NM 00311	
			acidic, cysteine-rich/SPARC	182120	_l ∞	5931.3-932
			osteoprotegrin ligand/OPGL/tumor			
			necrosis factor receptor superfamily,			
			member 1.1a, activator of			
			NFKB/TNFRSF11A	602642	602642 NM 003839	13q14
			bone morphogenetic protein 1/BMP1	112264	112264 NM_006132	8p21
			bone morphogenetic protein 2			
			precursor/BMP2	112261	112261 NM_001200	20p12
		Вопе	bone morphogenetic protein 3			ł
Calcium		Growth	(osteogenic) precursor/BMP3	112263	112263 NM 001201	4p14-q21
Homeostasis		Factors	bone morphogenetic protein 4/BMP4	112262	112262 NM_001202	14q22-q23
			bone morphogenetic protein 5/BMP5	112265	***	Chr. 6
			bone morphogenetic protein 6/BMP6	112266	NM 001718	6p24-p23
	Bone		osteogenic protein 1/OP1/bone			
	Growth		morphogenetic protein 7			
	Factors and		precursor/BMP7	112267	112267 NM 001719	Chr.20
	Receptors		osteogenic protein 2/OP2/bone			
			morphogenetic protein 8			
			precursor/BMP8	602284	602284 NM 001720 1n35-n37	1n35-n32

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		osteoprotegerin/OPG/tumor necrosis			
•		factor receptor superfamily, member			
		11b/TNFRSF11B	602643	602643 NM_002546	8q24
		bone morphogenetic protein receptor,			
	Becentors	type IA/BMPR1A	601299	601299 NM_004329	10q22.3
	signatura	bone morphogenetic protein receptor,			
		type IB/BMPR1B	603248	603248 NM_001203	4q23-q24
		bone morphogenetic protein receptor,		00100 PAIA	
		type II precursor (serine/threonine	60003	1NIM_00120	2q33-q34
		kinase)/BMPR2		4	•
		cytochrome P450, subfamily XXVIIB			
÷		Biosynthesis (25-hydroxyvitamin D-1-alpha-			
		hydroxylase), polypeptide 1/CYP27B1 264700 NM_000785	264700	NM_000785	12q14
		vitamin D (1,25- dihydroxyvitamin			
	Receptors	D3) receptor/VDR	601769	601769 NIM_000376 12q12-q14	12q12-q14
·		nuclear receptor coactivator 2/GRIP1	601993	601993 NM_006540	****
		vitamin D3 receptor interacting			
		protein/DRIP80	****	AF105421	***
	Signalling	vitamin D3 receptor interacting			
Vitamin D		protein/DRIP92	****	AF106934	****
		vitamin D3 receptor interacting			
		protein/DRIP130	****	AF105332	****
		cytochrome P450, subfamily XXIV			
-		(vitamin D 24-hydroxylase)/CYP24	126065	126065 NM_000782\0q13.2-q13.2	0q13.2-q13.3
		serum vitamin D-binding			
	Metabolism	protein/DBP/group-specific			
		component/GC	139200	L10641	4q12
		calbindin 3, (vitamin D-dependent			
		calcium-binding protein)/CALB3	302020	302020 NM 004057	Xp

		Regulation	X-linked hypophosphatemia protein/HYP/phosphate-regulating endonentidase homolog X-	307800	Y10196	Xp22.2-
			linked/PHEX/PEX			p22.1
			alkaline phosphatase,	171760	171760 NM_00047	1-76-1
			liver/bone/kidney/ALPL	1/1/00	∞	1pso.1-ps4
			solute carrier family 17 (sodium	107700	NM_00507	9
Phosphate	Phosphate	*	phosphate), member 1/SLC17A1	102300	4	opzs-pz1.3
Homeostasis	Metabolism		solute carrier family 17 (sodium	182200	187200 NM_00305	36-3
			phosphate), member 2/SLC17A2	102309	2	ccbc
		Uptake	solute carrier family 17 (sodium	604216	NM_00549	
	•		phosphate), member 4/SLC17A4	007210	5	opzz-pz1.3
			solute carrier family 20 (phosphate	127570	137570 NM_00541	711 -114
	:		transporter), member 1/SLC20A1	0/6/61	5	2q11-q14
			type II sodium-dependent phosphate		07700 JAIX	
			transporter 3b/NAPI-3B/solute carrier	604217	604217 INIM 00042	****
		·	family 34, member 2/SLC34A2		4	
			interleukin 1 beta/IL1B	147720	AF043335	2q14
			interleukin 1 receptor, type VIL1R1	147810	NM_00087 7	2412
		Interleukins	Interleukins interleukin 1 receptor, type 2/IL1R2	147811	NM_00463	2q12-q22
			interleukin 6/IL6	147620	AF048692	7p21
			interleukin 6 receptor/IL6R	147880	NM_00056 5	1921
			transforming growth factor, beta-			
			1/TGFB1	190180	M60315	9q13.1-q13.2
	Cytokines		transforming growth factor, beta-	10000		
			2/ 1 OF D2	130770	190220 NM 005238	1941

		transforming growth factor, beta-			
	Transformin 3/TGFB3	3/TGFB3	190230	190230 NM_003239	14q24
	g Growth Factor	transforming growth factor, beta receptor I (activin A receptor type II-like kinase, 53kD)/TGFBR1	190181	NM_00461	9q33-q34
		transforming growth factor, beta receptor II (70-80kD)/TGFBR2	190182	NM_00324 2	3p22
		reansionning grownr actor, beta receptor III (betaglycan,	600742	NM_00324	1p33-p32
		antigen CD51/integrin, alpha-	0,000,	NM_00221	
		V/vitronectin receptor/CD51/ITGAV	193210	0	2q31-q32
	Adhesion	integrin, alpha5/fibronectin receptor, alpha subunit/FNRA/ITGA5	135620	NM_00220 5	12q11-q13
	Molecules	lymphocyte antigen CD11C/integrin, alpha-X/CD11C/TTGAX	151510	NM_00088	16p11.2
		lymphocyte antigen CD11A/integrin, alpha-L/CD11A/ITGAL	153370	NM_00220	16p11.2
Inflommotio		matrix metalloproteinase 1 (interstitial collagenase)/MMP1	120353	NM_00242 1	11q22-q23
n (additional		matrix metalloproteinase-like 1/MMPL1	***	NM_00414 2	****
Juflammation		matrix metalloproteinase 2 (neutrophil	-	120360 AH002654	16013
`		matrix metalloproteinase 3	20021	100700111	Ciboi
		(stromelysin 1, progelatinase)/MMP3	185250	185250 NM_002422	11923
		matrix metalloproteinase 8 (neutrophil			
		collagenase)/MMP8	120355	120355 NM_002424 11q21-q22	11q21-q22

120361 NIM 004994 185260 NIM 002425 1 185261 NIM 002426 600108 NIM 002427 600754 NIM 00499 602261 NIM 00242 8 602262 NIM 00414 602285 NIM 00414 603320 NIM 00465 9 603321 NIM 00698 603321 NIM 00669 8		-				
B, 92kD gelatinase, 92kD type IV collagenase)/MMP9 matrix metalloproteinase 10 (stromelysin 2)/MMP10 matrix metalloproteinase 11 (stromelysin 3)/MMP11 matrix metalloproteinase 13 (collagenase 3)/MMP13 matrix metalloproteinase 14 (membrane-inserted)/MMP14 matrix metalloproteinase 15 (membrane-inserted)/MMP16 matrix metalloproteinase 16 (membrane-inserted)/MMP17 matrix metalloproteinase 17 (membrane-inserted)/MMP17 matrix metalloproteinase 17 (membrane-inserted)/MMP19 matrix metalloproteinase 23A/MMP23A matrix metalloproteinase 24 matrix metalloproteinase 24 matrix metalloproteinase 24 (membrane-inserted)/MMP24 matrix metalloproteinase 24 (membrane-inserted)/MMP24			matrix metalloproteinase 9 (gelatinase			
collagenase)/MMP9 matrix metalloproteinase 10 (stromelysin 2)/MMP10 matrix metalloproteinase 11 (stromelysin 3)/MMP11 matrix metalloproteinase 13 (collagenase 3)/MMP13 matrix metalloproteinase 14 (membrane-inserted)/MMP15 matrix metalloproteinase 15 (membrane-inserted)/MMP16 matrix metalloproteinase 16 (membrane-inserted)/MMP16 matrix metalloproteinase 17 (membrane-inserted)/MMP17 matrix metalloproteinase 19/MMP19 matrix metalloproteinase 19/MMP19 matrix metalloproteinase 23A/MMP23A matrix metalloproteinase 24 matrix metalloproteinase 24 matrix metalloproteinase 24 (membrane-inserted)/MMP24 matrix metalloproteinase 24 (membrane-inserted)/MMP24			B, 92kD gelatinase, 92kD type IV			
matrix metalloproteinase 10 (stromelysin 2)/MMP10 matrix metalloproteinase 11 (stromelysin 3)/MMP11 matrix metalloproteinase 12 (collagenase 3)/MMP13 matrix metalloproteinase 14 (membrane-inserted)/MMP14 matrix metalloproteinase 15 (membrane-inserted)/MMP16 matrix metalloproteinase 17 (membrane-inserted)/MMP17 matrix metalloproteinase 17 (membrane-inserted)/MMP17 matrix metalloproteinase 19/MMP19 matrix metalloproteinase 23A/MMP23A matrix metalloproteinase 6 23A/MMP23B matrix metalloproteinase 24		·	collagenase)/MMP9	120361	NM 004994	20q11.2-q13
Proteases matrix metalloproteinase 11 (stromelysin 3)/MMP11 matrix metalloproteinase 12 matrix metalloproteinase 13 (collagenase 3)/MMP13 matrix metalloproteinase 14 (membrane-inserted)/MMP14 matrix metalloproteinase 15 (membrane-inserted)/MMP15 matrix metalloproteinase 16 (membrane-inserted)/MMP16 matrix metalloproteinase 17 (membrane-inserted)/MMP17 matrix metalloproteinase 19/MMP19 matrix metalloproteinase 19/MMP19 matrix metalloproteinase 23A/MMP23A matrix metalloproteinase 24 (membrane-inserted)/MMP24			matrix metalloproteinase 10			
matrix metalloproteinase 11 (stromelysin 3)/MMP11 matrix metalloproteinase 12 (macrophage elastase)/MMP12 matrix metalloproteinase 13 (collagenase 3)/MMP13 matrix metalloproteinase 14 (membrane-inserted)/MMP14 matrix metalloproteinase 15 (membrane-inserted)/MMP15 matrix metalloproteinase 17 (membrane-inserted)/MMP17 matrix metalloproteinase 19/MMP19 matrix metalloproteinase 19/MMP19 matrix metalloproteinase 23A/MMP23A matrix metalloproteinase 24 matrix metalloproteinase 24 matrix metalloproteinase 24 (membrane-inserted)/MMP24	Adhesion		(stromelysin 2)/MMP10	185260	NM_002425	11q22.3-q2
(stromelysin 3)/MMP11 matrix metalloproteinase 12 matrix metalloproteinase 13 (collagenase 3)/MMP13 matrix metalloproteinase 14 (membrane-inserted)/MMP14 matrix metalloproteinase 15 (membrane-inserted)/MMP15 matrix metalloproteinase 16 (membrane-inserted)/MMP16 matrix metalloproteinase 17 (membrane-inserted)/MMP17 matrix metalloproteinase 17 matrix metalloproteinase 23A/MMP23A matrix metalloproteinase 24 matrix metalloproteinase 24 (membrane-inserted)/MMP24			matrix metalloproteinase 11			
matrix metalloproteinase 12 (macrophage elastase)/MMP12 matrix metalloproteinase 13 (collagenase 3)/MMP13 matrix metalloproteinase 14 (membrane-inserted)/MMP14 matrix metalloproteinase 15 (membrane-inserted)/MMP15 matrix metalloproteinase 17 (membrane-inserted)/MMP17 matrix metalloproteinase 17 matrix metalloproteinase 19/MMP19 matrix metalloproteinase 23A/MMP23A matrix metalloproteinase 24 matrix metalloproteinase 24 matrix metalloproteinase 24 (membrane-inserted)/MMP24			(stromelysin 3)/MMP11	185261	NM_005940	22q11.2
(macrophage elastase)/MMP12 matrix metalloproteinase 13 (collagenase 3)/MMP13 matrix metalloproteinase 14 (membrane-inserted)/MMP14 matrix metalloproteinase 15 (membrane-inserted)/MMP15 matrix metalloproteinase 17 (membrane-inserted)/MMP17 matrix metalloproteinase 17 matrix metalloproteinase 19/MMP19 matrix metalloproteinase 23A/MMP23A matrix metalloproteinase 23B/MMP23B matrix metalloproteinase 23B/MMP23B matrix metalloproteinase 23B/MMP23B matrix metalloproteinase 23B/MMP23B			matrix metalloproteinase 12			1
		Proteases	(macrophage elastase)/MMP12	601046	NM_002426	1q22.2-q22.
600108 NM 002427 600754			matrix metalloproteinase 13			
602261 NM_00499 602262 NM_00544 602285 NM_00414 601807 NM_00242 603320 NM_00465 603321 NM_00669 8****** NM_00669			(collagenase 3)/MMP13	600108	NM_002427	11q22.3
602261 NM_00242 602262 NM_00594 602285 NM_00414 601807 NM_00242 603320 NM_00465 9 603321 NM_00669 ***********************************			matrix metalloproteinase 14	72000	NM 00499	ı
602261 NIM_00242 8 602262 NIM_00594 1 602285 NM_00414 1 601807 NIM_00465 9 603321 NIM_00669 ******* NIM_00669			(membrane-inserted)/MMP14	000/34	۸,	14q11-q12
602262 NM_00594 602285 NM_00414 601807 NM_00242 603320 NM_00465 603321 NM_00698 603321 NM_00669		<u>.</u>	matrix metalloproteinase 15			
602262 NM_00594 602285 NM_00414 601807 NM_00242 9 603320 NM_00465 9 603321 NM_00698 ******* NM_00669			(membrane-inserted)/MMP15	002201		16q13-q21
602285 NM_00414 602285 NM_00242 601807 P9 603320 NM_00665 603321 3 ******* NM_00669			matrix metalloproteinase 16	0,000	NM 00594	
602285 NM_00414 601807 NM_00242 9 603320 NM_00465 9 603321 NM_00698 ******* NM_00669			(membrane-inserted)/MMP16	707700	, =	8421
601807 NM_00242 603320 NM_00465 9 603321 NM_00698 ****** NM_00669	****		matrix metalloproteinase 17	30000		20,000
601807 NM_00242 603320 NM_00465 9 603321 3 ******* NIM_00669			(membrane-inserted)/MMP17	002285	ı —	12924.33
603320 NM_00465 603321 NM_00698 ****** NM_00669			matrix metalloproteinase 19/MMP19	601807	NM_00242 9	12q14
603321 NM_00698 ****** NM_00669			matrix metalloproteinase 23A/MMP23A	603320	NM_00465 9	1p36.3
0 NM_00669		****	matrix metalloproteinase 23B/MMP23B	603321	NM_00698	1p36.3
0			matrix metalloproteinase 24	***	MM_00669	***
Toklo 6 Canding to the Control of th			(membrane-inserted)/MMP24		0	*
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		Toblog	Charles of Land and Land			

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Class	Pathway	Function	Name	OMIM	GID	Locus
			aromatic L-Amino Acid			
		Biosynthesis		107930	AH005280	
			decarboxylase			7p11
			tyrosine hydroxylase/TH	191290	191290 NM_000360	11p15.5
			dopamine receptor D1/DRD1	126449 NM	NM_000794	5q35.1
			dopamine Receptor D2/DRD2	126450	126450 NM_000795	11923
		Receptors	dopamine Receptor D3/DRD3	126451	126451 NM_000796	3q13.3
			dopamine receptor D4/DRD4	126452	126452 NM 000797	11p15.5
			dopamine receptor D5/DRD5	126453	126453 NM 0007984p16.1-p15.3	4p16.1-p15.3
		Reuptake	solute carrier family 6 member	126455	NM_00104	\$p15.3
	Donamina				+	
	Pathway		dopamine beta-nydroxylase (dopamine beta-monooxygenase)/DBH		223360 NM_000787	9q34
			catechol-O-methyltransferase/COMT	116790	NM_000754	2
			encoding mitochondrial	309850	NM_00024 0	Xp11.23
		Catabolism	encoding mitochondrial	309860	NM_00089 8	Xp11.23
			phenol-preferring sulfotransferase, family 1A, member 1/SULT1A1	171150	NM_00105 5	16p12.1- p11.2
			phenol-preferring sulfotransferase, family 1A, member 2/SULT1A2	601292	NM_00105 4	16p12.1- p11.2
			phenol-preferring sulfotransferase, family 1A, member 3/SULT1A3	600641	L19956	16p11.2
			dopamine beta-hydroxylase (dopamine beta-monooxygenase)/DBH	223360	223360 NM_000787	9934
•		Biosynthesis	phenylethanolamine-N-			
			methyltransferase/PNMT	171190	171190 NM_002686	17q21-q22

		tyrosine hydroxylase/TH	191290	191290 NM 000360	11p15.5
		adrenergic receptor alpha-1A	104010	027000 744	į
		odronownia manufactor 170	104219	104219 INIM 000078	Cnr.20
		adrenergic receptor alpha-1B	104220	104220 INM_000679	5q33
		adrenergic receptor alpha-IC			
		/ADRA1C	104221	104221 NM 000680	8p21
		adrenergic receptor alpha-1D			
		/ADRA1D	104222	M76446	20p13
	Recentors	adrenergic receptor alpha-2A			
	sioidaaas	(platelet)/ADRA2A	104210	104210 NM_000681	10q24-q26
		adrenergic receptor alpha-2B (hepatic,			
		renal)/ADRA2B	104260	104260 NM_000682	Chr.2
inonhaino		adrenergic receptor alpha-2C			
and Nor		(renal)/ADRA2C	104250	104250 NM_000683	4q16.1
inenhrine		adrenergic receptor beta-1/ADRB1	109630	109630 NM_000684	10q24-q26
Pathway		adrenergic receptor beta-2/ADRB2	109690	109690 NM_000024	5q32-q34
î		adrenergic receptor beta-3/ADRB3	109691	109691 NM_000025	8p12-p11.2
		beta-adrinergic receptor kinase			
		1/ADRBK1/BARK	109635	109635 NM 001619	11cen-q13
		beta-adrinergic receptor kinase			
	Signalling	2/ADRBK2	109636	X69117	22q11
	5.8mmmg	guanine nucleotide binding protein (G			
		protein), beta polypeptide 2-like			
		1/GNB2L1	109760	109760 NM 006098 5q11.2-q13	5q11.2-q13
		arrestin, beta 1/ARRB1	107940	107940 NM 004041	11q13
		vesicular amine transporter 2 / VAT2	193001	L09118	10q25
	Reuntake	vesicular amine transporter 1/ VAT1	193002	****	8p21.3
		Solute carrier family 6, member	0000		
نل		S/SLC6AZ/NAT1/NET1	163970	163970 NM_001043	16q12.2

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		encoding mitochondrial	309850	NM_00024 0	Xp11.23
	Catabolism	encoding mitochondrial	309860	NM_00089 8	Xp11.23
		catechol-O-methyltransferase/COMT	116790	116790 NM 000754	22q11.2
		choline acetyltransferase/CHAT	118490	118490 NM_003055	10q11.2
	Biosynthesis	Biosynthesis carnitine acetyltransferase/CRAT	600184	600184 NM_004003	9q34.1
		apolipoprotein E	107741	107741 NM_000041	19q13.2
		cholinergic receptor, muscarinic			
		1/CHRM1	118510	118510 NM_000738	11913
		cholinergic receptor, muscarinic			
		1/CHRM2	118493	118493 NM 000739	7q35-q36
	•	cholinergic receptor, muscarinic			
		1/CHRM3	118494	U29589	1q41-q44
		cholinergic receptor, muscarinic		i e	
		1/CHRM4	118495	118495 NM_000741 11p12-p11.2	11p12-p11.2
		cholinergic receptor, muscarinic			
-		1/CHRM5	118496	AF026263	15q26
		cholinergic receptor, nicotinic, alpha			
		polypeptide 1 (muscle)			
		precursor/CHRNA1	100690	100690 NM_000079	2q24-q32
		cholinergic receptor, nicotinic, alpha			
		polypeptide 2 (neuronal)/CHRNA2	118502	118502 NM_000742	Chr.8
		cholinergic receptor, nicotinic, alpha			
		polypeptide 3 (neuronal)			
		precursor/CHRNA3	118503	118503 NM_000743	15q24
		cholinergic receptor, nicotinic, alpha			
		polypeptide 4 (neuronal)			
		precursor/CHRNA4	118504	118504 NM_000744 0q13.2-q13.3	0q13.2-q13.

Acetylcholin e Pathwav	Recentors	cnollnergic receptor, nicotinic, alpha			
Acetylcholin e Pathwav		polypeptide 5 (neuronal)			
e Pathway		precursor/CHRNA5	118505	118505 NM_000745	15q24
		cholinergic receptor, nicotinic, alpha			
		polypeptide 6 (neuronal)			
		precursor/CHRNA6	****	***** NM_004198	***
		cholinergic receptor, nicotinic, alpha			
		polypeptide 7 (neuronal)			
<u> </u>		precursor/CHRNA7	118511	118511 NM_000746	15q14
		cholinergic receptor, nicotinic, beta			
		polypeptide 1 (muscle)/CHRNB1	100710	100710 NM_000747	17p12-p11
		cholinergic receptor, nicotinic, beta			
		polypeptide 2 (neuronal)/CHRNB2	118507	118507 NM_000748	1p21
	•	cholinergic receptor, nicotinic, beta			
		polypeptide 3/CHRNB3	118508	118508 NM_000749	8p11.2
		cholinergic receptor, nicotinic, beta			
		polypeptide 4/CHRNB4	118509	118509 NM 000750	15q24
		cholinergic receptor, nicotinic, epsilon			
		polypeptide/CHRNE	100725	100725 NM_000080	Chr.17
		cholinergic receptor, nicotinic, delta			
		polypeptide/CHRND	100720	100720 NM_000751	2q33-q34
		cholinergic receptor, nicotinic, gamma			
		polypeptide/CHRNG	100730	100730 NM_005199	2q33-q34
	•	solute carrier family 18 (vesicular			
*	Keuptake	acetylcholine), member 3/SLC18A3	600336	600336 NM_003055	10q11.2
		acetylcholinesterase (YT blood group)			
	-	precursor/ACHE	100740	100740 NM 000665	7q22
<u> </u>	Catabolism	butyrylcholinesterase 1/serum			
		cholinesterase 1/BCHE1	177400	177400 NM 0000553q26.1-q26.2	3q26.1-q26.2

		butyrylcholinestarase 2/serum			
		cholinesterase 2/BCHE2	177500	****	2q33-q35
		aromatic L-Amino Acid			
•		Decarboxylase/AADC	107930	AH005280	7p11
		tryptophan hydroxylase (tryptophan 5-			
	•	monooxygenase)/TPH	191060	191060 NM_004179 11p15.3-p14	11p15.3-p14
	•	14-3-3 protein tyrosine 3-			
	ta se [®] esseq.	monooxygenase/tryptophan 5-			
	1	monooxygenase activation protein, eta			
		polypeptide/YWHAH	113508	13508 NM 003405	22q12
		14-3-3 protein tyrosine 3-			
	-	monooxygenase/tryptophan 5-			
		monooxygenase activation protein,			
	Ricevnthesis	Biosynthesis epsilon polypeptide/YWHAE	****	19290 WN *****	****
		14-3-3 protein tyrosine 3-			
		monooxygenase/tryptophan 5-			
		monooxygenase activation protein,			
		zeta polypeptide/YWHAZ	601288	601288 NM_003406p25.2-p25.	2p25.2-p25.1
		14-3-3 protein tyrosine 3-			
	•	monooxygenase/tryptophan 5-			
	•	monooxygenase activation protein,			
		beta polypeptide/YWHAB	601289	601289 NM_003404	20q13.1
		14-3-3 protein tyrosine 3-			
		monooxygenase/tryptophan 5-			
	•	monooxygenase activation protein,			
:1		theta polypeptide/YWHAQ	****	***** NM_006826	****
**	,	G protein-coupled 5-			
ar.	-	hydroxytryptamine (serotonin)	1097601	109760 NM 000524 5q11.2-q13	5a11.2-a13
•					

G protein-coupled 5- hydroxytryntamine (serotonin)			
free for the minima (oct occurred)	182131	182131 NM 000863	6913
G protein-coupled 5-		t	
hydroxytryptamine (serotonin)	312861	U49516	Xq24
G protein-coupled 5-			
hydroxytryptamine (serotonin)	182133	182133 NM_000864 1p36.3-p34.3	1p36.3-p34.
G protein-coupled 5-			
hydroxytryptamine (serotonin)	182132	182132 NM_000865	6q14-q15
G protein-coupled 5-			
hydroxytryptamine (serotonin)	182134	L05597	3p12
G protein-coupled 5-			
hydroxytryptamine (serotonin)	182135	D87030	13q14-q21
G protein-coupled 5-			-
hydroxytryptamine (serotonin)	601122	601122 NM_0008672q36.3-q37.1	2q36.3-q37.
G protein-coupled 5-			
hydroxytryptamine (serotonin)	312861	NM_000868	Xq24
gated ion channel 5-			
hydroxytryptamine (serotonin)	182139	098000 MN	1q23.1-q23.
gated ion channel 5-			
hydroxytryptamine (serotonin)	*****	NM_006028	****
G protein-coupled 5-			
hydroxytryptamine (serotonin)	602164	Y08756	5q31-q33
G protein-coupled 5-		٠	
hydroxytryptamine (serotonin)	601305	X81411	7q36.1
G protein-coupled 5-			
hydroxytryptamine (serotonin)	601109	NM_000871	1p36-p35
G protein-coupled 5-			
hydroxytryptamine (serotonin)	182137	L21195	10q21-q24
	on channel (serotonin) on channel 5- ytryptamine (serotonin) on channel 5- ytryptamine (serotonin) sin-coupled 5- ytryptamine (serotonin) sin-coupled 5- ytryptamine (serotonin) sin-coupled 5- ytryptamine (serotonin) ytryptamine (serotonin)	serotonin) serotonin) serotonin) serotonin)	serotonin) 312861 NJ serotonin) ****** NJ serotonin) 602164 serotonin) 601305 serotonin) 601109 NJ serotonin) 182137

			solute carrier family 6			
			(neurotransmitter transporter,			
		Reuptake	serotonin), member 4/SLC6A4	182138	182138 NM_001045 17911.1-912	17q11.1-q12
			monoamine oxidase A, nuclear gene			
			encoding mitochondrial	309850	309850 NM_000240	Xp11.23
		Catabolism	monoamine oxidase B, nuclear gene			1
		Catabolism	encoding mitochondrial	309860	M69177	Xp11.23
			serotonin N-Acetyltransferase/SNAT	600950	U40347	17q25
			tryptophan 2,3-dioxygenase/TDO2	191070	191070 NM_005651	4q31-q32
		Biosynthesis	adenylosuccinate lyase/ADSL	103050	103050 NM_000026	22q13.1
			adenylosuccinate synthetase/ADSS	103060	103060 NM_001126	lcen-q12
			adenosine A1 receptor (G-protein			
		-	coupled)/ADORA1	102775	102775 NM_000674	1932.1
			adenosine A2a receptor (G-protein			
			coupled)/ADORA2A	102776	102776 NM_000675	22q11.2
			adenosine A2b receptor (G-protein			
			coupled)/ADORA2B	600446	600446 NM_000676 17p12-p11.2	17p12-p11.2
			adenosine A3 receptor (G-protein			
			coupled)/ADORA3	600445	600445 NM 000677	1p21-p13
			adenosine A2 receptor-			
			like/ADORA2L1	102777	****	0q25.3-q26.3
			purinergic receptor P2X, ligand-gated			
	•		ion channel, 1/P2RX1	600845	600845 NM_002558	****
			purinergic receptor P2X, ligand-gated			
			ion channel, 3/P2RX3	600843	600843 NM 002559	11912
			purinergic receptor P2X, ligand-gated			
			ion channel, 4/P2RX4	600846	600846 NM_002560	12q24.32
Neuro-		Receptors	purinergic receptor P2X, ligand-gated			
ndooring	Adenosine		ion channel, 5/P2RX5	602836	602836 NM_002561	****

Control of	Pathway		purinergic receptor P2X, ligand-gated			
Heart Rate.			ion channel, 7/P2RX7	602566	602566 NM_002562	12q24
Vascular			purinergic receptor P2Y (G-protein			
Tone, and			coupled) 1/P2RY1	601167	601167 NM_002563	3q25
Renal			purinergic receptor P2Y (G-protein			
Function			coupled) 2/P2RY2	600041	U07225	1q13.5-q14.1
			purinergic receptor P2Y (G-protein			
			coupled) 4/P2RY4	300038	300038 NM_002565	Xq13
			purinergic receptor P2Y (G-protein			
			coupled) 6/P2RY6	602451	602451 NM_004154	11q13.5
			leukotriene B4 receptor/purinergic			•
			receptor P2Y (G-protein coupled)			
			7/P2RY7	601531	601531 NM_000752 14q11.2-q12	14q11.2-q12
	. •		purinergic receptor P2Y (G-protein			
			coupled) 11/P2RY11	602697	602697 NM_002566	***
			Solute carrier family 29 (nucleosides),			
		Dountake	member 1/SLC29A1/ENT1	602193	602193 NM_0049556p21.2-p21.1	6p21.2-p21.
		Neuptane	Solute carrier family 29 (nucleosides),			
			member 2/SLC29A2/ENT2	602110	X86681	11q13
		Catabolism	adenosine deaminase	102700	102700 NM_000022	20q13.11
		Biosynthesis	Histidine Decarboxylase	142704	M60445	15q21-q22
			histamine H1 receptor/HRH1	600167	NM_00086	3p21-p14
		Receptors	histamine H2 receptor/HRH2	142703	AB023486	***
	Histaminergi		histamine H3 receptor/HRH3	****	NM_00723	****
	c Fathway		Histamine.N-	****	***** NM 006895	chr. 2
			Amine oxidase (copper-containing)			
	_	Catabolism 2/AOC2	2/AOC2	602268	D88213	17q21

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		Annine oxidase (copper-containing)			
	·	3/AOC3	603735	AF054985	17q21
		nitric oxide synthetase 1/NOS1	163731	AH001515	AH001515 2q24.2-q24.3
		nitric oxide synthetase 2A/NOS2A	163730	X85766	17cen-q11.2
		macrophage nitric oxide synthetase			
		2B/NOS2B	600719	AH006623	17p13.1-q25
		macrophage nitric oxide synthetase			
	Biosynthesis 2C/NOS2C	2C/NOS2C	600720	600720	17p13.1-q25
Nitric Ovide		nitric oxide synthetase 3/NOS3	163729	AH001515	7q36
Pathway	:	chondrocyte nitric oxide synthetase			
· mmma		3/NOS4	163728	X73029	****
		arginase/ARG1	207800	207800 NM_000045	****
		arginase/ARG2	107830	107830 NM_001172 4q24.1-q24.	4q24.1-q24.2
٠		guanylate cyclase 1, soluble, beta 2/GU 603695	603695	AF038499	13q14.3
	Recentors	guanylate cyclase 1, soluble, beta 3/GU 139397 NM_000857	139397	NM_000857	4q32
	a condition of	guanylate cyclase 1, soluble, alpha 3/G 139396 NM_000856	139396	NM_000856	4q32
		guanylate cyclase 1, soluble, alpha 2/G 601244 NM_000855	601244	NM_000855	11q21-q22
		membrane			
		metalloendopeptidase/MME/neutral			
	•	endopeptidasc	120520	120520 NM_000902	3q21-q27
		calpain, large polypeptide L3/CAPN3	114240	114240 NM_000070 5q15.1-q21.	5q15.1-q21.1
		leucyl/cystinyl	151300	151300 NM 005575	****
		carboxypeptidase N polypeptide			
General		1/CPN1	603103	603103 NM 001308	chr. 10
Metabolism	Biosynthesis	carboxypeptidase N polypeptide			
for Pentide	and		603104	J05158	8p23-p22
Hormones	Catabolism	meprin alpha subunit/MEP1A	886009	600388 NM_0059256p21.2-p21.1	5p21.2-p21.1
	· ·	meprin beta subunit/MEP1B	688009	600389 NM_005925 8q12.2-q12.	8q12.2-q12.3
		prolyl endopeptidase/PREP	600400	600400 NM_002726	6q22

		neuroendocrine convertase 1/NEC1	162150	D73407	5q14-q21
		peptidylglycine alpha-amidating	170270	019000 MM 072071	5014-021
		naired basic amino acid cleavino		, , , , , , , , , , , , , , , , , , ,	1
		enzyme/PACE/FIJR	136950	X04329	15a25-a26
	Rinevntheeie	Chologophinia / CTV	110110	000000 Fer	
Cholecyctoki	Diosymenesis	Diosymmesis Cholecystokinin/CCK	118440	118440 NM_000/29	3pter-p21
nin (CCE)	Dogontore	Cholecystokinin A receptor/CCKAR	118444	118444 NM_0007304p15.2-p15.	4p15.2-p15.1
mm (cons)	Neceptors	Cholecystokinin B receptor/CCKBR	118445	NM_000731	118445 NM_000731 1p15.5-p15.4
	Biosynthesis	Biosynthesis Neuropeptide Y/NPY	162640	162640 NM_000905	7p15.1
		Neuropeptide Y receptor Y1/NPY1R	162641	162641 NM_000909	4q31.3-q32
Neuropentid		Neuropeptide Y receptor Y2/NPY2R	162642	162642 NM_000910	4q31
e V (NPV)	Recentors	Neuropeptide Y receptor			
(* * * *) * ^	s ioidaaw	Y3/chemokine receptor	162643	X71635	2q21
•		Neuropeptide Y receptor Y5/NPY5R	602001	602001 NM_006174	4q31-q32
		Neuropeptide Y receptor Y6/NPY6R	0//109	601770 NM_006173	5q31
	Discipation	kininogen/KNG	096877	****	3927
	Diosymenesis	kallikrein 1/KLK1	147910	AH002853	AH002853 9q13.2-q13.4
		bradykinin receptor B1/BDKRB1 G			
	Dogonton	protein-coupled	600337	NM_000710	600337 NM_000710 4q32.1-q32.5
	veceptor	bradykinin receptor B2/BDKRB2 G			
		protein-coupled	113503	NM_000623	113503 NM_000623 4q32.1-q32.2
Bradykinin	•	X-prolyl aminopeptidase			
		(aminopeptidase P) 2, membrane-			
		bound/XPNPEP2	300145	300145 NM_003399	Xq25
	Catabolism	carboxypeptidase N, polypeptide 1,			
		50kD/CPN1	603103	603103 NM_001308	Chr.10
		carboxypeptidase N, polypeptide 2,			
•		83kD/CPN2	603104	***	8p23-p22

Adrenomedu		adrenomedullin/ADM			
Ilin	Biosynthesis		103275	103275 NM 001124	11015.4
		angiotensinogen/angiotensin I/AGT	106150	106150 NM 000029	-
		renin/REN	179820	179820 NM 000537	1932
		renin-binding protein/RENBP	312420	312420 NM 002910	Xq28
		membrane			
	Riceynthoeis	metalloendopeptidase/MME/neutral			
	Sicon in Cold	endopeptidase	120520	120520 NM 000902	3q21-q27
		thimet oligopeptidase 1/THOP1	601117	601117 NM_003249	19p13.3
		chymase 1, mast cell/CMA1	118938	118938 NM 001836	14q11.2
		angiotensin converting			
Angiotensin		enzyme/dipeptidyl	106180	106180 NM_000789	17q23
		angiotensin receptor 1/AGTR1	106165	106165 NM 000685	3q21-q25
		angiotensin receptor 1B/AGTR1B	600015	600015 NM_004835	****
	Receptors	angiotensin receptor-like 1/AGTRL1	600052	600052 NM_005161	11912
		angiotensin receptor-like 2/AGTRL2	601256	601256 NM_005162	***
		angiotensin receptor 2/AGTR2	300034	300034 NM_000686	Xq22-q23
		X-prolyl aminopeptidase			
		(aminopeptidase P) 2, membrane-			
		bound/XPNPEP2	300145	300145 NM_003399	Xq25
	Catabolism	prolylcarboxypeptidase/PRCP	176785	176785 NM_005040	11914
		arginine vasopressin (neurophysin II,			
2		antidiuretic honnone, diabetes			
	Biosynthesis	Biosynthesis insipidus, neurohypophyseal)/AVP	192340	192340 NM 000490	20p13
		arginine vasopressin receptor			
Vasopressin		1A/AVPR1A	600821	600821 NM_000706 12q14-q15	12q14-q15
	Receptors	arginine vasopressin receptor	600054	F0F000	
		IDIAVENID	000204	000204 NM 000/0/	1932

		arginine vasopressin receptor 2			
		(nephrogenic diabetes	304800	304800 NM_000054	Xq28
	Catabolism	Catabolism leucyl/cystinyl	151300	151300 NM_005575	****
		prepro-vasoactive intestinal	192320	AH003029	6q26-q27
	Biosynthesis	Biosynthesis adenylate-cyclase activating			
		polypeptide 1/ADCYAP1	102980	102980 NM_001117	18p11
Vecceptive		vasoactive intestinal peptide receptor			
Intestinal		1/VPR1	192321	192321 NM_004624	3p22
Pentide	¥	vasoactive intestinal peptide receptor			
anidat	Receptor	2/VIPR2	601970	601970 NM_003382	7q36.3
	٠	adenylate cyclase activating			
		polypeptide 1 (pituitary) receptor type			
		VADCYAPIRI	102981	102981 NM_001118	7p14
•		atrial natriuretic peptide precursor			
je-		A/NPPA	108780	X01471	1p36.2
	Biosynthesis	Biosynthesis natriuretic peptide precursor B/NPPB	600295	600295 NM 002521	1p36.2
		atrial natriuretic peptide precursor			
		C/NPPC	600296	D28874	2q24-qter
Natrimpetic		natriuretic peptide receptor			
Pentide		A/guanylate cyclase A (atrionatriuretic			
anuda e		peptide receptor C)/NPR1	108960	108960 NM_000906	1q21-q22
	Decembers	natriuretic peptide receptor B, isoform			
	s rondanav	a/NPR2	108961	108961 NM 000907	9p21-p12
		natriuretic peptide receptor			
		C/guanylate cyclase C (atrionatriuretic			
		peptide receptor C)/NPR3	108962	108962 NM 000908	5p14-p12
		cytochrome P450, subfamily XIB,			
	Synthesis	polypeptide 2 (steroid 11-b-			
	(additional	hydroxylase)/CYP11B2	124080	124080 NM 000498	8q21

	genes in	sodium channel, nonvoltage-gated 1			
	steroid	alpha/SCNN1A	600228	600228 NM_001038	12p13
	hormone	sodium channel, nonvoltage-gated 1,			
	metabolism	beta (Liddle syndrome)/SCNN1B	92009	600760 NM_000336 16p13-p12	16p13-p12
Mineralocort	pelow)	sodium channel, nonvoltage-gated 1,			
ionetaroide		gamma/SCNN1G	600761	600761 NM_001039 16p13-p12	16p13-p12
(aldosterone		mineralocorticoid			
deamontico		receptor/MCR/nuclear receptor			-
sterone)		subfamily 3, group C, member	600983	600983 NM_000901	4q31.1
		nuclear receptor coactivator 2/GRIP1	601993	601993 NM_006540	***
	Receptor	oxysterol binding protein/OSBP	167040	167040 NM_002556	11q12-q13
	and	sterol regulatory element binding			
	Coactivators	Coactivators transcription factor 1/SREBF1	184756	184756 NM_004176	17p11.2
		sterol regulatory element binding			
		transcription factor 2/SREBF2	600481	600481 NM_004599	22q13
		steroid receptor coactivator 1/SRC1	602691	602691 NM_003743	2p23
		steroid receptor RNA activator/SRA	603819	603819 AF092038	Chr. 5
		cytochrome P450, subfamily XIX			
	Synthesis	(androgen aromatase)/CYP19	107910	107910 NM_000103	15q21.1
		estrogen receptor 1/ESR1	133430	133430 NM_000125	6q25.1
Estrogens	Recentors	estrogen receptor 2/ESR2	601663	601663 X99101	14q
	STOID	estrogen-related receptor	601998	601998 NM_004451	11912
		estrogen-related receptor beta/ESRRB	602167	602167 NM_004452	14q24.3
	Catabolism	Catabolism estrogen-preferring	600043	600043 NM 005420	4q13.1
		hydroxy-delta-5-steroid		NIA DODGE	
		dehydrogenase, 3 beta- and steroid	109715	109715 MINI_00060	1p13.1
	Conthoois	delta-isomerase 1/HSD3B1		7	ı

•					
		hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 2/HSD3B2	201810	201810 NM_00019	1p13.1
Progestins		progesterone receptor/PGR	264080	NM_00092 6	11922
		heat shock 90-kD protein 1, alpha	1 40571	* * * *	1,21,2,22
	Receptors	heat shock 90-kD protein 1, beta	1/00+1		77h-7:17h1
		subunit/HSPCB	140572	104988	6p12
		FK506-binding protein 5/FKBP5	602623	NM_00411 7	**
		steroid-5-alpha-reductase, alpha			
		polypeptide 1 (3-oxo-5 alpha-steroid	`		
•		delta 4-dehydrogenase alpha			
		1)/SRD5A1	184753	184753 NM_001047	5p15
	Cynthonic	hydroxysteroid (17-beta)			
	Symmesus	dehydrogenase 3/HSD17B3	264300	264300 NM_000197	9q22
		cytochrome P450, subfamily XIA		97000 MIN	
Anarogens		(cholesterol side chain	118485	1000 T	15q23-q24
		cleavage)/CYP11A		-	
		steroid 5-alpha-reductase 2/SRD5A2	264600	264600 NM_000348	2p23
		androgen receptor			
	Receptor	(dihydrotestosterone receptor)/AR	313700	313700 NM 000044	Xq11-q12
		UDP glycosyltransferase 2 family,			
	Catabolism	Catabolism polypeptide B17/UGT2B17	601903	601903 NM_001077	4q13
		nuclear receptor coactivator 2/GRIP1	601993	601993 NM_006540	***
Mediators of		oxysterol binding protein/OSBP	167040	167040 NM_002556	11q12-q13
Steroid		sterol regulatory element binding			
Response	Transcriptio	Transcriptio transcription factor 1/SREBF1	184756	184756 NM_004176	17p11.2

	•	_				
	(common to	n Factors	sterol regulatory element binding			
	the steroid		transcription factor 2/SREBF2	600481	600481 NM_004599	22q13
	hormones)		steroid receptor coactivator 1/SRC1	602691	602691 NM 003743	
			steroid receptor RNA activator/SRA	603819	AF092038	Chr. 5
			vascular endothelial growth		NM 00337	
			factorVEGFA	192240		6p12
		Diograph	vascular endothelial growth		NM 00337	l
		Diosymmesis	factor/VEGFB	601398	_7	11913
	Vascular		vascular endothelial growth		NM 00542	•
	Endothelial		factor/VEGFC	601528		****
	Growth		kinase insert domain			
	Factor		receptor/KDR/FLK1/VEGF			
		Pecentors	receptor/VEGFR	191306	AF063657	4912
		eioidaan	fms-related tyrosine kinase 1 (vascular			
		•	endothelial growth factor/vascular		NM 00201	
			permeability factor receptor)/FLT1	165070	9	13q12
	Growth	Biosynthesis	Biosynthesis growth hormone/GH1	139250	139250 NM_000515	17q22-q24
	Hormone	Receptors	growth hormone receptor/GHR	600946	600946 NM_000163	5p13-p12
			endothelin 1/EDN1	131240	131240 NM 001955	6p24-p23
		Biosynthesis	endothelin 2/EDN2	131241	131241 NM 001956	1p34
			endothelin 3/EDN3	131242	131242 NM_0001140q13.2-q13	.0q13.2-q13.2
	Endothelin		endothelin converting enzyme 1/ECE1	600423	600423 NM_001397	1p36.1
	ï	Recentors	endothelin A receptor isoform delta			
			3/EDNRA	131243	AF014826	Chr.4
_1			endothelin receptor type B/EDNRB	131244	131244 NM_000115	13922
			protein kinase C beta/PRKCB	176970	X06318	16p11.2
			transforming growth factor, beta-			
			1/TGFB1	190180	M60315	9q13.1-q13.2

	Biosynthesis	biosynthesis transforming growth factor, beta-	190220	B50500 MIN 005039	
		2/ IOFD2	120220	14IM _003230	1441
Tronsformin		transforming growth factor, beta-			
a Crowth		3/TGFB3	190230	190230 NM_003239	14q24
E Glowdie Factor Beta		transforming growth factor, beta		NPA DOAK	
		receptor I (activin A receptor type II-	190181	10±00-141V1	9933-934
		like kinase, 53kD)/TGFBR1		7	
	Receptors	transforming growth factor, beta	190182	NM_00324	3n22
		receptor II (70-80kD)/TGFBR2	201071	2	2740
		dansioning grown racioi, bela		NM 00324	
	·	receptor III (betaglycan,	600742	3	1p33-p32
		heparin-binding growth factor 1/FGF1		131220 NM_000800	5q31
		basic fibroblast growth factor/FGF2	134920	134920 NM_002006	4q25-q27
•	-	fibroblast growth factor 3/FGF3	164950	164950 NM 005247	11913
		HST oncogene/fibroblast growth			
		factor 4/FGF4	164980	164980 NM_002008	11q13
		fibroblast growth factor-related			
		protein/FGF5	165190	165190 NM_004464	4q21
		fibroblast growth factor 6/FGF6	134921	X57075	12p13
		keratinocyte growth factor/fibroblast			
		growth factor 7/FGF7	148180	148180 NM_002009 15q15-q21.1	15q15-q21.
		fibroblast growth factor 8 (androgen-			
	Biosynthesis	Biosynthesis induced)/FGF8	600483	600483 NM_006119	10q24
		fibroblast growth factor 9 (glia-			
		activating factor)/FGF9	600921	600921 NM_002010 13q11-q12	13q11-q12
		fibroblast growth factor 10/FGF10	602115	602115 NM_004465	5p13-p12
		fibroblast growth factor 11/FGF11	601514	601514 NM_004112	17q21
Fibroblast		fibroblast growth factor 12/FGF12	601513	****	3q28
Canada Canada		fibroblast growth factor 13/FGF13	300070	300070 NM 004114	Xq26.3

	Factor		fibroblast growth factor 14/FGF14	601515	601515 NM 004115	13934
			fibroblast growth factor 16/FGF16	603724	603724 NM 003868	*
			fibroblast growth factor 17/FGF17	603725	603725 NM 003867	8p21
			fibroblast growth factor 18/FGF18	603726	603726 NM 003862	*
			fibroblast growth factor 19/FGF19	603891	NM_005117	****
			fibroblast growth factor receptor			8p11.2-
			1/FGFR1	136350	****	p11.1
			fibroblast growth factor receptor 2			
		Ÿ	(bacteria-expressed kinase,			
			keratinocyte growth factor receptor,			
			craniofacial dysostosis 1, Crouzon			
		Receptors	syndrome, Pfeiffer syndrome, Jackson-	-	NM 00014	
			Weiss syndrome)/FGFR2	176943	, –	10q26
			fibroblast growth factor receptor 3			
	•		(achondroplasia, thanatophoric		NM 00524	
			dwarfism)/FGFR3	134934	7	4p16.3
			fibroblast growth factor receptor		NM_00201	
			4/FGFR4	134935	-	5q35.1-qter
			somatostatin transcription factor			
Growth			1/STF1/homeodomain transcription			
Factors			factor/insulin promoter factor 1/IPF1	600733	600733 NM 000209	13q12.1
		Biosynthesis	paired box gene 6/PAX6	106210	NM_00028 0	11p13
			somatostatin/SST	182450	182450 NM 001048	3q28
	Somatostatin		preprocortistatin/CORT	602784	602784 NM 001302	1p36
			Somatostatin receptor 1/G protein-			
			coupled/SSTR1	182451	182451 NM_001049	14q13
			Somatostatin receptor 2SSTR2	182452	182452 NM 001050	17q24

	Keceptors	Somatostatin receptor 3/adenyl cyclase			
		coupled/SSTR3		182453 NM_001051	22q13.1
		Somatostatin receptor 4/SSTR4	182454	182454 NM 001052	20p11.2
		Somatostatin receptor 5/SSTR5	182455	182455 NM_001053	16p13.3
		somatostatin transcription factor			
		1/STF1/homeodomain transcription			
		factor/insulin promoter factor 1/IPF1	600733	600733 NM_000209	13q12.1
		insulin/INS	176730	176730 NM_000207	11p15.5
	Biosynthesis	sulfonylurea receptor Biosynthesis (hyperinsulinemia)/SUR	605009	NM_00035	
•		beta-cell inward rectifier			
		subunit/BIR/potassium inwardly-	600037		11111
		rectifying channel, subfamily J,	156000	786067	1.61411
·		member 11/KCNJ11			
Inculin		carboxypeptidase E/CPE	114855	114855 NM_001873	Chr.4
mment		insulin receptor/INSR	147670	147670 NM_000208	19p13.2
		insulin receptor substrate 1/IRS1	147545	NM_00554 4	2q36
	Receptor	insulin receptor substrate 2/IRS2	600797	NM_00374 9	13q34
		insulin receptor substrate 4/IRS4	603510	603510 NM_00360	***
	;	amylin/diabetes-associated		NM 00041	12n12 3-
	Signaling	peptide/DAP/islet amyloid polypeptide/IAPP	147940	5	p12.1
	Metabolism	Metabolism insulin-degrading enzyme/IDE	146680	146680 NM_004969	10q23-q25
		insulin-like growth factor 1	147440	1127014	12q22-
	Discomthacie	Bingundhania (somatomedin C)/IGF1	14/440	IVI2 / 344	q24.1

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		insulin-like growth factor 2			
		(somatomedin A)/IGF2	147470	147470 NM_000612	11p15.5
		insulin-like growth factor 1 receptor			
	Docontors	precursor/IGF1R	147370	147370 NIM_000875 15q25-q26	15q25-q26
	veceptors	insulin-like growth factor 2			
		receptor/IGF2R	147280	147280 NM_000876	6q26
Insulin-Like		insulin-like growth factor binding prote 146730 NM_000596	146730	NM_000596	7p14-p12
Growth		insulin-like growth factor binding prote 146731	146731	M35410	2q33-q34
Factor		insulin-like growth factor binding prote 146732 NM_000598	146732	NM_000598	7p14-p12
		insulin-like growth factor binding prote 146733	146733	Y12508	17q12-q21
	Requisition	insulin-like growth factor binding prote 146734	146734	AF055033	2q33-q36
		insulin-like growth factor binding prote 146735	146735	M69054	12q13
		insulin-like growth factor binding prote 602867 NM_001553	298709	NM_001553	4q12
		connective tissue growth factor/CTGF/ 121009 NM_001901	121009	NM_001901	6q23.1
		insulin-like growth factor binding prote 602369 NM_001554	602369	NM_001554	1p22.3
		insulin-like growth factor binding prote 601489 NM_004970	601489	NM_004970	Chr. 16
		protease, serine, 11 (IGF			
	Catabolism	binding)/PRSS11	602194	602194 NM_002775 0q25.3-q26.2	0q25.3-q26.2
		angiopoietin 1/ANGPT1	601667	601667 NM_00114 6	8922
	Riocynthesis	angiopoietin 2/ANGPT2	601922	601922 NM_00114	8p21
Angiopoietin			603874	NM_00467	***
		angiopoietin 4/ANGPT4	603705	AF113708	20p13
		angiopoietin 5/ANGPT5	****	AF152562	****
		protein receptor tyrosine kinase,		34 0004E	
	Receptors	epithelial-specific 2/TIE2/TEK	600221	00045	9p21
		tyrosine kinase, endothelial/TEK		,	

			platelet-derived growth factor alpha			
			polypeptide/PDGFA	173430	173430 NM_002607	7 _{p22}
	Platelet.	Biosynthesis	Biosynthesis platelet-derived growth factor beta			
	Derived		polypeptide (simian sarcoma viral (v-			
	Growth		sis) oncogene homolog)/PDGFB	190040	NM_002608	190040 NM_0026082q12.3-q13.1
	Factor		platelet-derived growth factor			
		Recentors	receptor, alpha polypeptide/PDGFRA	173490	173490 NM_006206	4q12
		Signature	platelet-derived growth factor			
			receptor, beta polypeptide/PDGFRB	173410	173410 NM_002609	5q31-q32
			phosphodiesterase I.A, calmodulin-			
			dependent/PDE1A	171890	171890 NM 005019	Chr.4
			phosphodiesterase 1B, calmodulin-			
			dependent/PDE1B	171891	171891 NM_000924	12q13
	•		phosphodiesterase 1C, calmodulin-			
	•	Phosphodiest	Phosphodiest dependent/PDE1C	602987	602987 NM_005020	****
_		erases	phosphodiesterase 3A, cGMP-			
			inhibited/PDE3A	123805	123805 NM_000921	11p15
			phosphodiesterase 3B, cGMP-			
			inhibited/PDE3B	602047	602047 NM_000922	11p15
_			phosphodiesterase 5A, cGMP-	603310	603310 NM_00108	4026
			specific/PDE5A	2222	3	7440
		÷	protein kinase, AMP-activated, alpha 1 602739 NM 006251	602739	NM_006251	5p12
			protein kinase, AMP-activated, beta 1 r 602740 NM_006253	602740	NM_006253	12q24.1
		AMP.	protein kinase, AMP-activated, gamma 602742 NM_002733	602742	NM_002733	12q13.1
		Activated	protein kinase, AMP-activated, alpha		NM_00625	
		Protein	2 catalytic subunit/PRKAA2	600497	2	1p31
		Kinases	protein kinase, AMP-activated, beta 2	602741	NM_00539	***************************************
			non-catalytic subunit/PRKAB2	14/700	6	***

	protein kinase, Ami -activateu,			
•	gamma 2 non-catalytic	602743	* * *	7q35-q36
cGMP- Dependent	protein kinase, cGMP-dependent, regulatory, type I/PRKG1	176894	D45864	10q11.2
Protein Kinases	protein kinase, cGMP-dependent, type II/PRKG2	601591	NM_00625	4q13.1- q21.1
	protein kinase, cAMP-dependent, regulatory, type I, alpha (tissue specific extinguisher 1)/PRKAR1A	188830	NM_00273	17q23-q24
	protein kinase, cAMP-dependent, regulatory, type I, beta/PRKAR1B	176911	***	7pter-p22
cAMP-	protein kinase, cAMP-dependent, regulatory, type II, alpha/PRKAR2A	176910	NM_00415 7	3p21.3- p21.2
Protein Kinases	protein kinase, cAMP-dependent, regulatory, type II, beta/PRKAR2B	176912	176912 NM_00273	7922
	protein kinase, cAMP-dependent, catalytic, alpha/PRKACA	601639	601639 NM_00273	19p13.1
	protein kinase, cAMP-dependent, catalytic, beta/PRKACB	176892	NM_00273	1p36.1
	protein kinase, cAMP-dependent, catalytic, gamma/PRKACG	176893	NM_00273 2	9413
	guanine nucleotide binding protein (G protein), alpha 11 (Gq class)/GNA11	139313	NM_00206	19p13
	guanine nucleotide binding protein (G protein), alplia 13/GNA13	**	NM_00657 2	* * *
	guanine nucleotide-binding protein (G protein), alpha 14 /GNA14	* * * *	NM_00429	***
	guanine nucleotide binding protein (G protein), alpha 15 (Gq class)/GNA15	139314	NM_00206 8	19p13

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18p11.22- p11.21	16q13	9q21	22q11.2	1pter-p31.2	7q21-q27	**	12p13	****	***	****	1p22	* * *	
NM_00207	Y18213	600998 NM_00207	NM_00207	****	139390 NM_00527	176981 NM_00609	NM_00207 5	***** NM_00657	AF188177	***** NM_00448	NM_00527 4	NM_00514 5	
139312	139311	866009	139160	139380	139390	176981	139130	* * *	* * *	* * * * *	600874	* * *	
guanine nuclectide binding protein (G protein), alpha activating activity polypeptide L, olfactory type/GNAL	guanine nucleotide binding protein (G protein), alpha activating activity polypeptide O/GNAO1	guanine nucleotide binding protein (G protein), q polypeptide/GNAQ	guanine nucleotide binding protein (G protein), alpha z polypeptide/GNAZ	guanine nucleotide binding protein (G protein), beta polypeptide 1/GNB1	guanine nucleotide binding protein (G protein), beta polypeptide 2/GNB2	guanine nucleotide binding protein (G protein), beta polypeptide 2-like 1/GNB2L1/RACK1	guanine nucleotide binding protein (G protein), beta polypeptide 3/GNB3	guanine nucleotide binding protein (G protein), beta 5/GNB5	guanine nucleotide binding protein (G protein), gamma 3/GNG3	guanine nucleotide binding protein (G protein), gamma 4/GNG4	guanine nucleotide binding protein (G protein), gamma 5/GNG5	guanine nucleotide binding protein (G protein), gamma 7/GNG7	2000 2000 2000 2000 2000 2000 2000 200
						G-Proteins							
										Cocond	Messengers	***************************************	••

Particulation of the control of the

	guanine nucleotide binding protein (G protein), gamma 8/GNG8	* * * *	AF188179	***
	guanine nucleotide binding protein (G protein), gamma 10/GNG10	***	NM_00412 5	***
	guanine nucleotide binding protein (G protein), gamma 11/GNG11	***	NM_00412 6	****
	guanine nucleotide binding protein (G protein), gamma 12/GNG12	* * * *	AF188181	**
	guanine nucleotide binding protein (G protein), alpha stimulating activity polypeptide 1/GNAS1	139320	NM_00051 6	20q13.2
	guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 1/GNAI1	139310	NM_00206 9	7q21
G-Protein Modulators	guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 2/GNAI2	139360	NM_00207	3p21
	guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 3/GNAI3	139370	NM_00649 6	1p13
	guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide H/GNAIH	139180	* * * *	12p13-p12
Protein Tyrosine Kinases	v-src avian sarcoma (Schmidt-Ruppin A-2) viral oncogene homolog/SRC	190090	190090 NM_00541	20q12-q13
	protein kinase C alpha/PRKCA	176960	NM_00273	17q22- q23.2
	protein kinase C beta/PRKCB	176970	X06318	16p11.2

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			NM_00625	
Calcium-	protein kinase C, delta/PRKCD	176977	4	3р
and			NM_00540	
Diacylglycer	Diacylglycer protein kinase C, epsilon/PRKCE	176975	0	2p21
ol-Activated	protein kinase C gamma/PRKCG	176980	****	19q13.4
Protein	protein kinase C, iota/PRKCI	300094	300094 NM_002740	Xq21.3
Kinases	protein kinase C, mu/PRKCM	****	***** NM 002742	***
	On Williams C. Abote (BDVO)	077007	NM_00625	10.16
	protein kinase C, theta FracQ	000448	/	cidui
	protein kinase C, zeta/PRKCZ	176982	NM_00274 4	* * *
(Ca++)-	protein phosphatase 3, catalytic			
Calmodulin-	subunit A, alpha isoform/PPP3CA	114105	M29550	4q21-q24
at	protein phosphatase 3, catalytic	, , , , ,		
Protein	subunit A, beta isotorm/PPP3CB	114106	M29551	10q21-q22
Phosphatase	protein phosphatase 3, regulatory			
S	subunit B, alpha isoform/PPP3CB	601302	***	2p16-p15
	mitogen activated protein kinase PRKM1/MAPK1/ERK2	176948	NM_00274 5	22q11.2
	mitogen activated protein kinase PRKM3/MAPK3/ERK1	601795	X60188	16p11.2
	mitogen activated protein kinase PRKM4/MAPK4	176949	NM_00274	18q12-q21
	mitogen activated protein kinase PRKM6/MAPK6	602904	NM_00274 8	* * * *
	mitogen activated protein kinase PRKM7/MAPK7	602521	NM_00274 9	17p11.2
Mitogen	mitogen activated protein kinase JNK1/PRKM8/MAPK8	601158	L26318	***
Antimotod	JIAN I/F INNIVIO/IVIAL INO			

Growth
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(additional
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Oncology)

1				
Kinases	mitogen activated protein kinase JNK2/PRKM9/MAPK9	602896	65760U	5693
	mitogen activated protein kinase JNK3/PRKM10/MAPK10	602897	U35003	* * *
	mitogen activated protein kinase PRKM11/MAPK11	602898	AF031135	* * * *
· · · · · · · · · · · · · · · · · · ·	mitogen activated protein kinase SAPK3/MAPK12	602399	NM_00296 9	22q13.3
	mitogen activated protein kinase PRKM13/MAPK13	602899	NM_00275 4	***
· ·	mitogen activated protein kinase SAPK2A/MAPK14	600289	NM_00131 5	6p21.3- p21.2
	BCL2	151430	M13994	18q21.3
	BCL-X/BCLX	600039	Z23115	****
				19q13.3-
	BCL2 associated protein/BAX	600040	L22473	q13.4
	-		NM_00118	6p21.3-
	BCL2-antagonist/killer 1/BAK1	600516	8	p21.2
· · · · · ·			NM_00432	
	BCL2-associated athanogene 1/BAG1	601497	3	9p12
			NM_00428	
		603882	2	****
		603883	AF095193	****
	BCL2-associated athanogene 4/BAG4	603884	AF095194	****
	BCL2-associated athanogene 5/BAG5 603885	603885	AF095195	****
	BCL-X/BCL-2 binding protein/BAD	603167	AF021792	****
			NM_00119	
	BCLZ-like 1/BCLZL1	600039	1	***
	BCL2-like 2/BCL2L2	601931	NM_00405	14q11.2- a12

	BCL2-like 11 (apoptosis		NM 00653	
	facilitator)/BCL2L11	603827	_ ∞	****
	BCL2-related protein A1/BCL2A1	601056	Y09397	15924.3
	BCL2-interacting protein		NM_00380	
	harikari/HRK	603447	9	****
	BCL-2 interacting killer/BIK	603392	U34584	****
.,	v-raf-1 murine leukemia viral		NM 00288	
	oncogene homolog 1/RAF1	164760	0	3p25
	tumor protein p53/TP53	191170	X02469	17p13.1
	superfamily, member		NM 00004	
	6/FAS/TNFRSF6	134637	_د	10q24.1
Apoptosis	nuclear factor kappa-B DNA binding subunit 1/NFKB1	164011	M58603	4q23-q24
	nuclear factor kappa-B DNA binding subunit 2/NFKB2	164012	NM_00250	10q24
	apoptosis-related cystein protease			11a22.2-
	1/caspase 1/CASP1	147678	L27475	q22.3
	apoptosis-related cystein protease			
	1/caspase 1/CASP2	600639	****	7935
	apoptosis-related cystein protease		NM 00434	4935, 4933
	1/caspase 1/CASP3	600636	9	q35.1
	apoptosis-related cystein protease		NM_00434	11q22.2-
	1/caspase 1/CASP4	602664	7	q22.3
	apoptosis-related cystein protease		NM_00434	11q22.2-
	1/caspase 1/CASP5	602665	_	q22.3
	apoptosis-related cystein protease		NM_00122	
	1/caspase 1/CASP6	601532	9	4q25-q25
-	apoptosis-related cystein protease		NM_00122	10q25.1-
	1/caspase 1/CASP7	601761	7	q25.2

Apoptosis

		apoptosis-related cystein protease		NM 00122	
		1/caspase 1/CASP8	601763	œ	2q33-q34
		apoptosis-related cystein protease			
		1/caspase 1/CASP9	602234	****	****
•		apoptosis-related cystein protease		NM_00123	
		1/caspase 1/CASP10	601762	0	2q33-q34
·		apoptosis-related cystein protease		NM_00372	
		1/caspase 1/CASP13	603653	, e	****
		ADP-ribosyltransferase (NAD+; poly			
		(ADP-ribose)		NM 00161	
		polymerase)/PARP/ADPRT	173870		1942
		poly (ADP-ribose)		NM_00363	
		glycohydrolase/PARG	603501		10q11.23
•				97 100 MN	
		cyclin-dependent kinase (CDK2)	116953	, ∞	12q13
				NM_00125	
	•	cyclin-dependent kinase (CDK3)	123828		17q22-qter
				10000 MN	
		cyclin-dependent kinase (CDK4)	123829	5	12q14
				NM_00493	
		cyclin-dependent kinase (CDK5)	123831	5	7q36
				NM_00125	
		cyclin-dependent kinase (CDK6)	603368	6	7q21-q22
				NM_00315	
		cyclin-dependent kinase (CDK7)	601955	7	2p15-cen
				NM_00126	
		cyclin-dependent kinase (CDK8)	603184	0	13q12
				NM_00126	
	;	cyclin-dependent kinase (CDK9)	603251	1	9q34.1
Cell Cycle	Cell Cycle	E2F transcription factor 1/E2F1	189971	M96577	20q11.2

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	-			NTA 00400	
		E2F transcription factor 2/E2F2	600426		1p36
		E2F transcription factor 3/E2F3	600427	NM_00194 9	6p22
		E2F transcription factor 4/E2F4	600659	NM_00195 0	16922.1
		E2F transcription factor 5/E2F5	296009	NM_00195	
		E2F transcription factor 6/E2F6	602944	NM_00195	***
		transcription factor Dp-1 (E2F		NM 00711	
		dimerization partner 1)/TFDP1	189902	J	13q34
		transcription factor Dp-2 (E2F		NM 00628	
		dimerization partner 2)/TFDP2	602160	9	3923
		proliferating cell nuclear		NM 00259	
		antigen/PCNA	176740	2	20p12
				NM_00464	
		sapiens nephrin/NPHN	602716	9	19q13.1
Adhesion	Adhesion	tyrosine kinase with immunoglobulin	00000	NM 00542	,
		domains/TIE1	777000	4	1p34-p33
		HMGCoA reductase/HMGCR	142910	142910 NM 000859 5q13.3-q14	5q13.3-q14
		3-hydroxy-3-methylglutaryl-			
		Coenzyme A synthase 1	142940	142940 NM_002130	5p14-p13
		squalene synthetase/arnesyl-			
		diphosphate farnesyltransferase	184420	184420 NM_004462 8p23.1-p22	8p23.1-p22
				!	

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		steroid-5-alpha-reductase, alpha			
•		polypeptide 1 (3-oxo-5 alpha-steroid			
		delta 4-dehydrogenase alpha			
		1)/SRD5A1	184753	184753 NM 001047	5p15
		steroid-5-alpha-reductase, alpha			
		polypeptide 2 (3-oxo-5 alpha-steroid			
		delta 4-dehydrogenase alpha			
		2)/SRD5A2	264600	264600 NM_000348	2p23
	Anabolism	steroidogenic acute regulatory	600617	MM_00034	0211.0
		protein/STAR	000017	6	7.11do
		cytochrome P450, subfamily XIA		95000 YEV	
		(cholesterol side chain	118485	118485 INIM _ UUU / 8	15q23-q24
		cleavage)/CYP11A			
General		cytochrome P450, subfamily XVII		0100010	
Steroid	•	(steroid 17-alpha-hydroxylase),	202110	202110 INIM_00010	10q24.3
Hormone		adrenal hyperplasia/CYP17		7	
Metabolism		hydroxy-delta-5-steroid		SOUGH PAIN	
(additional		dehydrogenase, 3 beta- and steroid	109715	109715 NIM _00080	1p13.1
genes in		delta-isomerase 1/HSD3B1		7	•
Toxicology)		hydroxy-delta-5-steroid		01000 744	
		dehydrogenase, 3 beta- and steroid	201810	201810 INIMI_00019	1p13.1
		delta-isomerase 2/HSD3B2		ø	
		dehydroepiandrosterone (DHEA)-		21.000 AHA	
		preferring sulfotransferase, family 2A, 125263	125263	1NM_00510	19913.3
		member 1/SULT2A1		`	
		estrogen-preferring	600043	600043 NM 005420	4q13.1
		UDP glycosyltransferase 1/UGT1	191740	191740 NM_00107	Chr. 12
		UDP glycosyltransferase family 2, member B4/I IGT2B4	290009	NM_00107	4q13
	Catahaliam				

	* Catabolism	-	İ		
			890009	NM_00107 4	1914
		UDP glycosyltransferase 2 family, polypeptide B11/UGT2B11	603064	603064 NM_00107	* * * * * *
		UDP glycosyltransferase family 2, member B15/UGT2B15	690009	NM_00107 6	4q13
		UDP glycosyltransferase family 2, member B17/UGT2B17	601903	NM_00107	1914
		acetyl-Coenzyme A carboxylase alpha/ACACA	200350	NM_00066 4	17q21
*		acetyl-Coenzyme A carboxylase beta/ACACB	601557	NM_00109 3	12q24.1
		acetyl-Coenzyme. A acetyltransferase 1 (acetoacetyl Coenzyme A thiolase)/ACAT1	203750	NM_00001 9	11q22.3- q23.1
	Biosynthesis	acetyl-Coenzyme A acetyltransferase 2 (acetoacetyl Coenzyme A thiolase)/ACAT2	100678	NM_00589	6925.3-926
		ATP citrate lyase/ACLY	108728	NM_00109 6	17q21.1
		glycerol-3-phosphatė acyltransferase, mitochondrial/GPAM1	602395	****	10924-926
		fatty acid synthase/FASN	600212	NM_00410 4	17q25
		apolipoprotein A1 of HDL/APOA1	107680	107680 NM 000039	11923
		apolipoprotein A2/APOA2	107670	107670 NM_001643	1q21-q23
		apolipoprotein A4/APOA4	107690	107690 NM_000482	11923
		apolipoprotein B (including Ag(x)			
		antigen)/ArUB	107730 [1	107730 NM_000384	2p24

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	Spolimonator Dan Data			
,	enzyme, catalytic polypeptide	600130	600130 NM 005889	12p13.1
*	APOBEC1 binding			1
	protein/ABBP1/heterogeneous nuclear			
	ribonucleoprotein A/B/HNRPAB	602688	602688 NM_004499	*****
Transport	apolipoprotein C1/APOC1	107710	107710 NM 001645	19q13.2
	apolipoprotein C2/APOC2	207750	207750 NM_000483	3 19q13.2
	apolipoprotein C3/APOC3	107720	107720 NM_000040	11923
	apolipoprotein C4/APOC4	600745	600745 NM_001646	19q13.2
	apolipoprotein D/APOD	107740	107740 NM_001647	3q26.2-qter
	apolipoprotein E/APOE	107741	107741 NM_000041	19q13.2
	apolipoprotein F/APOF	107760	107760 NM_001638	Chr.12
	apolipoprotein H (beta-2-glycoprotein			
	I)/APOH	138700	138700 NM_000042	17q23-qter
	apolipoprotein J/clustrin/APOJ/CLU	185430	185430 NM 001831	8p21-p12
	apolipoprotein L/APOL	603743	AF019225	Chr. 22
	pancreatic triglyceride lipase/PNLIP	246600	AH003527	10926.1
	enterostatin/colipase, pancreatic/CLPS		120105 NM 001832 6pter-p21.1	6pter-p21.1
	high density lipoprotein			
	receptor/CD36 antigen (collagen type I			
	receptor, thrombospondin receptor)-		NM 00550	
	like 1/CD36L1/SRB1	601040	. 5	Chr. 12
	cubilin (intrinsic factor-cobalamin	602997	NM_00108	10n12 1
	receptor) precursor/CUBIN		1	
	cholesterol efflux regulatory protein/Cl 600046 NM_005502	600046	NM_005502	9q22-q31
	low density lipoprotein receptor			
	(familial hypercholesterolemia)/LDLR 143890 NM_000527 9p13.2-p13.1	143890	NM_000527	9p13.2-p13.1
	law density lipoprotein receptor-			
	related protein 1/LRP1	107770	NM_002332	107770 NM_002332 2q13.1-q13.3

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		low density linonrotain recentor			
		related protein 2/LRP2	600073	U33837	2q24-q31
	Uptake	low density lipoprotein receptor-			
		related protein 5/LRÞ5	603506	AF077820	11q13.4
		low density lipoprotein receptor-			
		related protein 8/LRP8	602600	602600 NM_004631	1p34
		low density lipoprotein receptor-			
		related protein-associated protein	104225	104225 NM_002337	4p16.3
		oxidized low density lipoprotein			
		receptor/OLR1	602601	602601 NM_002543	12p13-p12
		very low density lipoprotein			
		receptor/VLDLR	192977	192977 NM_003383	9p24
		microsomal triglyceride transfer			
٠		protein large subunit/MTP	157147	157147 NM_000253	4q22-q24
		sortilin related receptor/SORL1	602005	602005 NM_003105 1q23.2-q24.2	1q23.2-q24.
		plasma cholesterol ester transfer			
		protein/CETP	118470	118470 NM_000078	16q21
		phospholipid transfer protein/PLTP	172425	172425 NM_006227 20q12-q13.	20q12-q13.1
Lipid	Storage	glycerol-3-phosphate acyltransferase,			
Metabolism	28 rose	mitochondrial/GPAM1	602395	****	10q24-q26
		lipoprotein lipase/LPL	238600	238600 NM_000237	8p22
		lipase, hepatic/LIPC	151670	151670 NM_00023	15q21-q23
		adrenergic, beta-3-, receptor/ADRB3	109601	109691 NM_000025 8p12-p11.2	8p12-p11.2
	Release	lysosomal acid lipase/LIPB	278000	278000 NM_000235 10924-925	10q24-q25
		lipase, hormone-sensitive/LIPE	151750	151750 NM_005357 9q13.1-q13.	9q13.1-q13.
		perilipin/PLIN	170290	170290 NM_002666	15q26
	•	fatty acid binding protein 4,			
		adipocyte/FABP4	600434	600434 NM_001442	8q21

	Fatty acid CoA Ligase, long chain 1/FACL1	152425	* * *	3q13
	Fatty acid CoA Ligase, long chain 2/FACL2	152426	****	4q34-q35
Coenzyme A Ligases	Fatty acid CoA Ligase, long chain 3/FACL3	602371	NM_00445	2q34-q35
	Fatty acid CoA Ligase, long chain 4/FACL4	300157	NM_00445	Xq22.3
	Fatty acid CoA Ligase, very long chain 1/FACVL1	603247	N.	15q21.2
Ketogenesis	Coenzyme A synthase 2	600234	NM_00551 8	1p13-p12
	acyl-Coenzyme A dehydrogenase, long 201460 NM_001608	201460	NM_001608	2q34-q35
	acyl-Coenzyme A dehydrogenase, C-4 201450 NM 000016	201450	NM_000016	1p31
	acyl-Coenzyme A dehydrogenase, C-2	201470	201470 NM 000017	120
	camitine palmitoyltransferase I, liver,			
	nuclear gene encoding mitochondrial			
	protein/CPT1A	600528	600528 NM_001876	11q13
	carnitine palmitoyltransferase II,			
	nuclear gene encoding mitochondrial			
	protein/CPT2	600650	8600650 NM 000098	1p32
	carnitine/acylcarnitine	212138	212138 NM_000387	3p21.31
	enoyl-CoA, hydratase/3-hydroxyacyl CoA dehydrogenase/EHHADH	261515	261515 NM_00196	3927
	19/3			
		068009	600890 NM_00018	2n23
			7	

β-Oxidation	hydroxyacyl-CoA dehydrogenase/3- ketoacyl-CoA thiolase/enoyl-CoA hydratase, beta subunit/HADHB	143450	NM_00018	2p23
	acyl-Coenzyme A oxidase 1/ACOX1 (peroxisomal)	264470	NM_00403 5	17q25
	acyl-Coenzyme A oxidase 2, branched chain/ACOX2 (peroxisomal)	601641	NM_00350 0	3p14.3
	acyl-Coenzyme A dehydrogenase, C-2 to C-3 short chain precursor/ACADS (mitochondrial)	201470	NM_00001	12q22-qter
1	acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain/ACADM (mitochondrial)	201450	NM_00001 6	1p31
	acyl-Coenzyme A dehydrogenase, long chain/ACADL (mitochondrial)	201460	09100_MN 8	2q34-q35
	hydroxyacyl-Coenzyme A dehydrogenase, type II/HADH2	602057	NM_00449 3	**
	enoyl-Coenzyme A hydratase 1/ECH1 (peroxisomal)	969009	NM_00139 8	19913
	cystathionine-beta-synthase/CBS	236200	NM_00007	21q22.3
	cubilin (intrinsic factor-cobalamin receptor) precursor/CUBN	602997	602997 NM_00108	10p12.1
Homocystein	betaine-homocysteine S- Homocystein methyltransferase/BHMT	602888	NM_00171 3	****
e Metabolism	e 5-methyltetrahydrofolate- Metabolism homocysteine			
	methyltransferase/methionine	156570	156570 NM_000254	1943
	S-adenosylhomocysteine hydrolase/AHCY	180960	M61832	20cen-q13.1
ı		•		

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·		methylenetetrahydrofolate			
		reductase/MTHFR	236250	AH007464	1p36.3
Purine	Purine	adenosine monophosphate deaminase i (isoform M)/AMPD1	102770	NM_00003 6	1p21-p13
Nucleotide	Ź	adenylosuccinate synthase/ADSS	103060	NM_00112 6	lcen-q12
		adenylosuccinate lyase/ADSL	103050	NM_00002 6	22q13.1
		sarcoglycan, delta (35kD dystrophin-associated glycoprofein)/SGCD	601411	NM_00033	5q33
		phospholamban/PLN	172405	NM_00266	6q22.1
		desmin/DES	125660	NM_00192	2q35
		cofilin 2 (muscle)/CFL2	601443	****	Chr. 12
	Structura	myosin heavy chain 7, cardiac muscle, beta/MYH7	160760	NM_00025	14q12
	and	cardiac myosin binding protein C/MYBPC3	856009	NM_00025 6	11p11.2
	Proteins	tropomyosin 1 (alpha)/TPM1	191010	00036 6	15q22.1
		troponin C, slow/TNNC1	191040	191040 NM_00328	3p21.3- p14.3
Cardiac Muscle		troponin I, cardiac/TNNI3	191044	NM_00036 3	19q13.4
Function		troponin T2, cardiac/TNNT2	191045	NM_00036 4	1q32
· ·		elastin (supravalvular aortic stenosis, Williams-Beuren syndrome)/ELN	130160	130160 NM_00050	7q11.2

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			ATPase, Ca++ transporting, cardiac	108730	M23114	16p12
		Sarcoplasmi		108740	NM_00168	12q23- q24.1
	. '	Function	ryanodine receptor 2 (cardiac)/RYR2	180902	NM_00103 5	19
			calsequestrin 2, fast twitch cardiac muscle/CASQ2	114251	NM_00123	1p13.3-p11
			mitochondrial tRNA-Leu (UUR)	590050	S55822	nmocmonari
Cardiac	•	Mitochondri	Mitochondri tafazzin (cardiomyopathy, dilated 3A		NTA 00011	
Muscle		al Function	(X-linked); endocardial fibroelastosis	300069	11000_tivis	Xq28
Structure			2; Barth syndrome/TAZ			
and		Receptors	focal adhesion kinase/FAK/PTK2 prote 600758 NIM_005607	600758	NM_005607	8q24-qter
Metabolism	•		sapiens potassium inwardly-rectifying 600681 NM_000891	600681	NM_000891	Chr. 17
			G-protein coupled inwardly rectifying			
			potassium channel/GIRK/potassium	601524	NM_00223	7,774 1
		Channele	inwardly-rectifying channel, subfamily			z4z4.1
	٠	Chamicis	J, member 3/KCNJ3.			
			ATP sensitive potassium inwardly-		טפטטט אַצוּע	
	•		rectifying channel, subfamily J,	600734	410000 TAINI	11q24
			member 5/KCNJ5		0	
	**		v-Ha-ras Harvey rat sarcoma viral	190020	NM_00534	112155
			oncogene homolog/HRAS	120020	3	c.c.iq.i
			v-Ki-ras2 Kirsten rat sarcoma 2 viral	190070	NM_00498	12n121
			oncogene homolog/KRAS2	0/00/1	5	14014.1
			neuroblastonia RAS viral (v-ras)	164700	NM_00252	12127
			oncogene homolog/NRAS	104/20	4	2.C1q1
			ras-related C3 botulinum toxin substrat 602048 NM_006908 Xq26.2-27.2	602048	NM_006908	Xq26.2-27.2
			ras-related C3 botulihum toxin substrat 602049 NM_00287222q12.3-q13.2	602049	NM_002872	2q12.3-q13.

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Res	Response to Mechanical		ras-related C3 botulinum toxin substrat	602050	NM_00505	17q24-qter
	Stress	Signaling	LIM domain kinase 1/LIMK1	601329	601329 NM_00231	7q11.23
			LIM domain kinase 2/LIMK2	601988	6 98500_MN 9	22q12
			cell division cycle 42 (GTP-binding pro	116952	NM_00179 1	1p36.1
			p21/Cdc42/Rac1-activated kinase 1 (yeast Ste20-related)/PAK1	602590	NM_002 <i>57</i> 6	11q13-q14
			protein kinase C-like 2/PRKCL2/RAK2	602549	NM_00625 6	* * *
			oligopherin/OPHN3/p21 (CDKN1A)-activated kinase 3/PAK3	300142	NM_00257 8	Xq21.3-q24
			cardiac-specific homeo box/CSX	600584	NM_00438	5q34
		Transcription Ractors	Transcriptio GATA-binding protein 4/GATA4	600576	600576 NM_00205	8p23.1-p22
			serum response factor (c-fos serum response element-binding transcription 600589 factor)/SRF	600289	NM_00313	*
			granulocyte-macrophage colony stimulating factor 2/CSF2	0968£1	NM_00075 8	5q31.1
			macrophage-specific colony- stimulating factor/CSF1	120420	AH005300	1p21-p13
		Growth	granulocyte colony stimulating factor 3/CSF3	138970	NM_00075 9	17q11.2- q12
		Factors	erythropoictin/EPO	133170	133170 NM_00079	7q21

		fit3 ligand/FMS-related tyrosine kinase 3 ligand/FLT3LG	600007	U03858	19913.3
		thrombopoietin (MLV oncogene ligand, megakaryocyte growth and development factor)/THPO	600044	NM_00046 0	3q26.3-q27
		granulocyte-macrophage colony stimulating factor 2 receptor, alpha, low-affinity/CSF2RA	306250	NM_00614 0	Xp22.32
		granulocyte-macrophage colony stimulating factor 2 receptor, beta/CSF2RB	138981	U18373	22q12.2- q13.1
Erythropoies is	Receptors	granulocyte-macrophage colony stimulating factor 2 receptor, alpha, Y chromasomal/CSF2RY	425000	***	Yp11
		erythropoietin receptor/EPOR	133171	NM_00012 1	19p13.3- p13.2
		colony stimulating factor 1 receptor/CSFR1	164770	U63963	5q33.2- q33.3
		myeloproliferative leukemia virus oncogene/MPL/thrombopoietin receptor/TPOR	159530	159530 NM_00537	1p34
		Janus kinase 2 (a protein tyrosine kinase)/JAK2	147796	NM_00497 2	9p24
		STAM-like protein containing SH3 and ITAM domains 2/STAM2	***	***** NM_00584	****
	Signaling, Transcriptio	ribosomal protein S7/RPS7	603474	603474 NM_00101	19q13.2
	n, and Translation	n, and signal transducer and activator of Translation transcription 5A/STAT5A	601511	601511 NM_00315	17q11.2

		Factors	BCI - X/BCI X	600039	723115	****
Ÿ	·		STAT induced STAT inhibitor 3/SSI-	604176	Z	***
			FMS-related tyrosine kinase 3/FLT3	136351	NM_00411 9	13q12
			ATP-binding cassette 7 iron transporter/ABCB7	300135	NM_00429 9	Xq13.1- q13.3
		Iron Uptake	matural resistance-associated macrophage protein 2/NRAMP2/solute carrier family 11,	600523	AB015355	12q13
			transferrin/TF	190000	NM_00106	3q21
			transferrin receptor (p90, CD71)/TFRC	190010	NM_00323 4	3q29
			transferrin receptor 2/TFR2	* * * *	NM_00322	***
Erythrocyte Production		Iron Transport	iron-responsive element-binding protein 1/iron regulatory protein 1 (IRE-BP1/IREB1	147581	M58511	Chr.9
Maintenance			iron-responsive element-binding protein 2/iron regulatory protein 2 (IRE-BP1/IREB2	147582	M58510	Chr.15
			ferritin, light polypeptide/FTL	134790	NM_00014 6	19q13.3- q13.4
			ferritin, heavy polypeptide 1/FTH1	134770	NM_00203 2	11
			aminolevulinate, delta-, synthase 1, nuclear gene encoding mitochondrial protein/ALAS1	301300	NM_00068 8	Xp11.21
			4czf01xls			<u>σ</u>

	····	aminolevulinate, delta-, synthase 2 (sideroblastic/hypochromic anemia), nuclear gene encoding mitochondrial orotein/ALAS2	125290	125290 NM_00003	3p21.1
		dehydratase/ALAD	125270	NM_00003 1	9434
-	Нете	uroporphyrinogen III synthase (congenital erythropoietic porphyria)/UROS	263700	NM_00037 5	10q25.2- q26.3
Heme	Synthesis	uroporphyrinogen decarboxylase/UROD	176100	NM_00037 4	1p34
		porphobilinogen deaminase/PBGD	176000	AH002926	11923.3
		protoporphyrinogen oxidase, nuclear gene encoding mitochondrial protein/PPOX	600923	NM_00030	1922
		coproporphyrinogen oxidase (coproporphyria, harderoporphyria), nuclear gene encoding mitochondrial protein/CPO	121300	121300 NM_00009	3q12
		ferrochelatase (protoporphyria), nuclear gene encoding mitochondrial protein/FECH	177000	177000 NM_00014	18q21.3
		hemoglobin, alpha 1/HBA1	141800	141800 NM_00051	16pter- p13.3
	Hemoglobin Synthesis	hemoglobin, alpha 2/HBA2	141850	141850 NM_00055	16pter- p13.3
		hemoglobin, beta/HBB	141900	NM_00051 8	11p15.5

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			serum beta-glycoprotein hemopexin/HPX	142290	AH002827	11p15.5- p15.4
			inducible heme oxygenase (decycling) 1/HMOX1	141250	NM_00213 3	22q12
			constitutive heme oxygenase (decycling) 2/HMOX2	141251	NM_00213 4	16p13.3
		Heme Catabolism	phenol and bilirubin UDP-glucuronosyltransferase/UDPglycosyltransferase 1/UGT1	191740	NM_00107	Chr.2
			UDP glycosyltransferase 2 family, polypeptide B4/UGT2B4	290009	AF064200	4q13
			UDP glycosyltransferase 2 family, polypeptide B7/UGT2B7	890009	NM_00107 4	4q13
			biliverdin reductase A/BLVRA	109750	NM_00071 2	7p14-cen
			biliverdin reductase B/BLVRB	600941	NM_00071	19q13.13- q13.2
·			ATPase, Ca++ transporting, cardiac muscle, fast twitch 1/ATP2A1	108730	M23114	16p12
			ATPase, Ca++ transporting, cardiac muscle, slow twitch 2/ATP2A2	108740	NM_00168	12q23- q24.1
		Calcium	ATPase, Ca++ transporting, ubiquitous/ATP2A3	601929	NM_00517 3	17p13.3
			ryanodine receptor 3 (brain and smooth muscle)/RYR3	180903	NM_00103 6	15q14-q15
			calcium channel, voltage-dependent, L type, alpha 1C subunit/CACNA1C	114205	114205 NM_000719	12p13.3
			shaker-related subfamily, member	176266	NM_00223 3	11q13.4- q14.1

		potassium voltage-gated channel, Isk-related family, member 1/KCNE1	176261	176261 NM_00021	21q22.1- q22.2
		potassium voltage-gated channel, Isk-related family, member 2/KCNE2	603796	603796 NM_00513	21922.1
	Potassium	potassium voltage-gated channel, subfamily H, member 2/KCNH2	152427	152427 NM_00023	7q35-q36
Cardiac and Vascular		potassium inwardly-rectifying channel, 600734 NM_00089 subfamily J, member 5/KCNJ5	600734	0 00089 0	11q24
Channels		potassium voltage-gated channel precursor, KOT-like subfamily,	192500	192500 NM_00021	11p15.5
		member 1/KCNQ1		8	1
		sodium channel, nonvoltage-gated 1			
		alpha/SCNN1A	600228	600228 NM_001038	12p13
•		sodium channel, nonvoltage-gated 1,			
		beta (Liddle syndrome)/SCNN1B	600760	600760 NM_000336 16p13-p12	16p13-p12
	Sodium	sodium channel, nonvoltage-gated 1,			
	manac	gamma/SCNN1G	600761	600761 NM_001039 16p13-p12	16p13-p12
		sodium channel, voltage-gated, type			
		V, alpha polypeptide (long	600163	600163 NM_00033	3n24-n21
		(electrocardiographic) QT syndrome		۶	1
		cystic fibrosis transmembrane			
		conductance regulator/CFTR/ATP-			
	Chlorida	binding cassette, subfamily C, member			
	ani iormo	7/ABCC7	602421	602421 NM_000492	7q31.2
		chloride channel, calcium activated,			
		family member 2/CLCA2	604003	604003 NM_006536	***
		H+-ATPase beta 1 subunit /ATP6B1	267300	267300 AH007312	2cen-q13

	solute carrier family 4, sodium bicarbonate cotransporter, member 4/SLC4A4	603345	NM_00375	4921
	solute carrier family 4, sodium bicarbonate cotransporter, member		NM_00378	
	5/SLC4A5	603318	∞	4q21
	carbonic anhydrase II/CA2	259730	90000 WN	8q22
مد مرمواند	carbonic anhydrase IV/CA4	114760	NM_00071 7	17923
	carbonic anhydrase XII/CA12	603263	AF051882	15q22
Acidosis	solute carrier family 4, bicarbonate/chloride anion exchanger,		NM_00034	
	member 1/SLC4A1	109270	7	17q21-q22
	solute carrier family 9, member A1/SLC9A1 (sodium/hydrogen ion)	107310	M81768	1p36.1-p35
	solute carrier family 9, member A2/SLC9A2 (sodium/hydrogen ion)	600530	NM_00304 8	2q11.2
	solute carrier family 9, member A3/SLC9A3 (sodium/hydrogen ion)	182307	* * * * * * * * * * * * * * * * * * * *	5p15.3
	solute carrier family 9 (sodium/hydrogen exchanger), isoform 3 regulatory factor 1/SLC9A3R1		NM_00425	
	solute carrier family 9 (sodium/hydrogen exchanger), isoform 3 regulatory factor 2/SLC9A3R2		NM_00478	
Lithosis	Solute carrier family 13, member 2/SLC13A2 (dicarboxylic acids)	604148	NM_00398 4	17p11.1- q11.1

Ion and Water Transport

Renal Channels

	chloride channel 5/CLCN5	300008	NM_00008 4	Xp11.22
	chloride channel Ka, kidney/CLCNKA 602024	602024	NM_00407 0	1p36
	chloride channel Kb, kidney/CLCNKB	602023	NM_00008 5	1p36
	solute carrier family 12 (sodium/potassium/chloride transporters), member 1/SLC12A1	600839	NM_00033	15q15- q21.1
	solute carrier family 12 (sodium/potassium/chloride transporters), member 2/SLC12A2	600840	NM_00104 6	5q23.3
	(sodium/chloride transporters),	600968	NM_00033 9	16q13
	ATPase, Na+/K+ transporting, alpha 1 polypeptide/ATP1A1	182310	NM_00070 1	1p13-p11
Urine Concentratio	Urine ATPase, Na+/K+ transporting, alpha 1 polypeptide-like/ATP1A1L	182360	NM_00167 6	13q12.1- q12.3
	ATPase, Na+/K+ transporting, alpha 2 polypeptide/ATP1A2	182340	NM_00070 2	<u> </u>
	ATPase, Na+/K+ transporting, beta 1 polypeptide/ATP1B1	182330	NM_00167 7	1q22-q25
	ATPase, Na+/K+ transporting, beta 2 polypeptide/ATP1B2	182331	X16645	17p
	ATPase, Na+/K+ transporting, beta 3 polypeptide/ATP1B3	601867	NM_00167 9	3q22-q23
	·	304800	NM_00005 4	Xq28
		107776	NM_00038 5	7p14

		aquaporin 2/AQP2	107777	107777 NM_00048	12q13
		aquaporin 3/AQP3	600170	600170 NM_00492 5	9p13
		aquaporin 6/AQP6	601383	NM_00165	12q13
Vesicle	Cytoskeletal	adducin 1 (alpha subunit)/ADD1	102680	NM_00111 9	4p16.3
Transport	Elements	adducin 2 (beta subunit)/ADD2	102681	AF001597	2p14-p13
		adducin 3 (gamma subunit)/ADD3	601568	D67031	10q24.2- q24.3
		gap junction protein, alpha 1, 43kD (connexin 43)/GJA1	121014	NM_00016 5	6q21-q23.2
		gap-junction protein alpha 3, 46kD (connexin 46)/GJA3	121015	AF075290	13q11-q12
		gap junction protein, alpha 4, 37kD (connexin 37)/GJA4	121012	121012 NM_00206	1p35.1
		gap junction protein, alpha 5, 40kD (connexin 40)/GJA5	121013	121013 NM_00526	1421.1
		gap junction protein, alpha 7, 45kD (connexin 45)/GJA7	***	NM_00549	***
Gap Junctions	Gap	gap junction protein, alpha 8, 50kD (connexin 45)/GJA8	600897	NM_00526	1421.1
		gap junction protein, beta 1, 32kD (connexin 32, Charcot-Marie-Tooth neuropathy, X-linked)/GJB1	304040	304040 NM_00016	Xq13.1
		gap junction protein, beta 2, 26 kD (connexin 26)/GJB2	121011	M86849	13q11-q12

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			gap junction protein, beta 3, 31 kD (connexin 31)/GJB3	603324	AF052692	1p35.1
			gap junction protein, beta 5, 31.1 kD (connexin 31.1)/GJB5	* * * *	AF052693	**
			gap junction protein, beta 6 (connexin 30)/GJB6	* * * *	NM_00678	****
			factor I/fibrinogen a, alpha/FGA	134820	134820 NM 000508	4928
			factor Vfibrinogen b, beta/FGB	134830	AH003492	4928
			factor L/fibrinogen g, gamma/FGG	134850	134850 NM 000509	
			factor II/prothrombin/F2	176930	F2	11p11-q12
			coagulation factor II (thrombin)			
			receptor/F2R	187930	187930 NM_001992	5q13
			coagulation factor II (thrombin)			
1	•		receptor-like 2/F2RL2	601919	601919 NM 004101	5q13
•			coagulation factor II (thrombin)			
			receptor-like 3/F2RL3	602779	602779 NM_003950	19p12
			tissue factor/factor	134390	134390 NM_001993	1p22-p21
			tissue factor pathway inhibitor			
			(lipoprotein-associated coagulation			
			inhibitor)/TFPI	152310	152310 NM_006287 2q31-q32.1	2q31-q32.1
-			tissue factor pathway inhibitor	600033	600033 NM_006528	7q22
			factor V/proaccelerih/labile factor/F5	227400	227400 NM 000130	1923
	-		factor VII/serum prothrombin			
			conversion accelerator/F7	227500	227500 NM_000131	13q34
		brin Formati	brin Formati factor VIII/antihemophilic factor/F8	306700	306700 NM_000132	Xq28
		-	factor IX/Christmas factor/plasma			
			thromboplastic component/hemophilia 306900 NM 000133Xq27.1-q27.2	306900	NM_000133	Xq27.1-q27.2
-			factor X/Stuart factor/F10	227600	227600 NM_000504	13934
			factor XI/plasma thromboplastin			
	Clotting		antecedent/F11	264900	264900 NM 000128	4935

		•				
			factor XII/Hageman factor/F12	234000	234000 NM 000505	5q33-qter
			factor XIIIa1/fibrin-stabilizing			
			factor/F13A1	134570	134570 NM 000129	6p25-p24
			factor XIIIb/fibrin-stabilizing	134580	****	1-
			prekellikrein/Fletcher factor/kallikrein			Y
			3, plasma /KLK3	229000	229000 NM 000892	4935
			kininogen/Flaujeac factor/KNG	228960	228960 NM 000893	
			protein S (alpha)/PROS1	176880	NM 000313	176880 NM 0003133p11.1-g11.2
Thrombus			protein C (inactivator of coagulation	<u>.</u>		
Formation			factors Va and VIIIa)/PROC	176860	176860 NM_000312	2q13-q14
			antithrombin III/AT3		NM_000488	1923-925
			gamma-glutamyl carboxylase/GGCX	137167	NM_00082 1	2p12
	•		plasminogen/PLG	173350	173350 NM 000301	6926
	•		monocyte antigen CD87/plasminogen			
			activator receptor, urokinase	173391	NM_00265	19013
			type/PLAUR/CD87		σ,	24.5
		Thrombolysi	Thrombolysi plasminogen activator,	191840	191840 NM 002658	10q24
-		Ø	plasminogen activator-tissue/PLAT	173370	A07197	
			plasminogen activator inhibitor, type I			
			(arginine-serpin)/PAI1	173360	X12701	7q21.3-q22
-			plasminogen activator inhibitor, type II			
			(arginine-serpin)/PAI2	173390	173390 NM_002575	18921.3
			integrin, alpha 2b (platelet			
			glycoprotein IIb of IIb/IIIa complex,			
			antigen CD41B)/ITGA2B	273800	273800 NM_000419	17921.32
			integrin beta chain, beta 3 (platelet		NM 00021	
			grycoprotein ma or mb/ma complex,	173470	2	
	•		antigen CD61)/11GB3		3	17q21.32

		glycoprotein Ib (platelet), alpha polypeptide/GP1BA	231200	NM_00017	17pter-p12
Adbesion	Clot	glycoprotein IX (platelet)/GP9	173515	NM_00017 4	3q21
	Adherence	calcium and integrin binding protein/CB	602293	U82226	15q25.3- q26
 		thrombospondin 1/THBS1	188060	NM_00324 6	-
		thrombospondin 2/THBS2	188061	NM_00324 7	6q27
		thrombospondin 3/THBS3	188062	NM_00711 2	1921
		thrombospondin 4/THBS4	600715	NM_00324 8	5q13
		small inducible cytokine subfamily A (Cys-Cys), member 2/monocyte chemotactic protein 1/MCP1/SCYA2	158105	158105 NM_00298	17q11.2- q12
		macrophage-specific colony- stimulating factor/CSF1	120420	AH005300	1p21-p13
		interleukin 1 alpha/IL1A	147760	M15329	2q14
		interleukin 1 beta/IL1B	147720	AF043335	2q14
		apoptosis-related cystein protease 1/interleukin 1-beta converting	147678	147678 NM_00122	11q22.2-
		enzyme/ICE/caspase 1/CASP1		m	q22.3
		interleukin 2/IL2	147680	X01586	4q26-q27
		interleukin 3/IL3	147740	147740 NM_00058	5q31.1
		interleukin 4/1L4	147780	NM_00058 9	5q31.1

interleukin 5/IL5	147850	NM_00087	5q31.1
interleukin 6/II.6	147620	AF048692	7p21
interleukin 7/IL7	146660	NM_00088 0	8q12-q13
interleukin 8/IL8	146930	M26383	4q12-q13
interleukin 9/IL9	146931	X17543	5931.1
interleukin 10/IL10	124092	M57627	1q31-q32
interleukin 11 beta/IL11B	147681	NM_00088 1	19q13.3- q13.4
 interleukin 12A (natural killer cell stimulatory factor 1, cytotoxic lymphocyte maturation factor 1, p35)/IL12A	161560	NM_00218	3p12-q13.2
 interleukin 12B/IL12B	161561	NM_00044 0	5q31.1- q33.1
interleukin 13/IL13	147683	NM_00218 8	5q31
interleukin 15/IL15	600554	U14407	4q31
interleukin 16/IL16	603035	NM_00451 3	***
lymphocyte-associated serine esterase	603149	NM_00219 0	2q31
 interleukin 18 (interferon-gamma- inducing factor)/IL18	600953	NM_00156 2	11q22.2- q22.3
 interleukin 1 receptor, type I/IL1R1	147810	NM_00087	2q12
 interleukin 1 receptor, type 2/IL1R2	147811	NM_00463 3	2q12-q22
-			

Cytokines in and Cytokine in Receptors

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AB 146710 NM_000218 AB 146710 RA 308380 NM_00020 TLAR 147781 NM_00041 RA 147781 NM_00041 RA 146661 NM_00218 10RA 146933 NM_00155 IRA 600939 NM_00553 600632 NM_00553 Colle42 NM_00155 Colle42 NM_00155	interleu ^t :n 1 receptor-like 2/IL1RL2	* * *		***
gen CD25/interleukin 2 147730 10p15-p14 lpha chain/IL2RA/CD25 146710 NM_00020 12 receptor, beta/IL2RB 146710 NM_00020 12 receptor, gamma 308385 NM_00020 13 alpha receptor/IL3RA 147781 NM_00041 15 receptor precursor/IL4R 147851 NM_00056 5 receptor/IL6R 146661 NM_00218 7 receptor/IL7R 146661 NM_00218 9 receptor/IL9R 300007 6 10 receptor alpha/IL10RA 146933 NM_00155 10 receptor beta/IL10RB ******* NM_00451 12 receptor, beta 600939 NM_00553 12 receptor, beta 600939 NM_00553 12 receptor, beta 601642 NM_00155	interleukin 1 receptor accessory protein/IL1RAP	602626	NM_00218 2	3928
12 receptor, beta/IL2RB 12 receptor, gamma 13 receptor, gamma 13 receptor, gamma 13 alpha receptor/IL3RA 14 receptor precursor/IL4R 14 receptor alpha/IL5RA 147781 8 15 receptor alpha/IL5RA 146661 7 receptor/IL6R 10 receptor/IL9R 10 receptor, alpha/IL10RA 11 receptor alpha/IL10RA 12 receptor alpha/IL11RA 13 receptor alpha/IL11RA 146933 10 receptor alpha/IL11RA 146933 11 receptor, beta 12 receptor, beta 13 receptor, beta 14 receptor, beta 15 receptor, beta 16 receptor, beta 17 receptor, beta 18 receptor, beta 18 receptor, beta 19 receptor, beta 10 receptor, beta 11 receptor, beta 12 receptor, beta 13 receptor, beta 14 receptor, beta 15 receptor, beta 16 receptor, beta 17 receptor, beta 18 receptor, beta 18 receptor, beta 19 receptor, beta 10 receptor, beta	B-cell antigen CD25/interleukin 2 receptor, alpha chain/IL2RA/CD25	147730	10p15-p14	10p15-p14
12 receptor, gamma 308380 6 6 13 alpha receptor/IL3RA 147781 8 15 receptor alpha/IL5RA 147781 147781 147782 15 receptor alpha/IL5RA 147880 146661 16 receptor/IL9R 10 receptor/IL9R 10 receptor alpha/IL10RA 146933 10 receptor 11 alpha/IL11RA 12 receptor, beta 12 receptor, beta 12 receptor, beta 1308385 10 NM_000451 8 112 receptor, beta 12 receptor, beta 1308380 144782 144782 1446652 15 16 receptor, alpha/IL10RA 146933 18 18 18 18 18 18 18 18 18 18 18 18 18	interleukin 2 receptor, beta/IL2RB	146710		22q11.2- q13
13 alpha receptor/IL3RA 308385 M74782 14 receptor precursor/IL4R 147781 NM_00041 6 receptor alpha/IL5RA 147851 M96652 6 receptor/IL6R 146661 NM_00056 9 receptor/IL7R 146661 NM_00218 9 receptor/IL9R 146933 NM_00155 10 receptor beta/IL10RA 146933 NM_0062 12 receptor 11 alpha/IL11RA 600939 NM_00553 12 receptor, beta 600939 NM_00553 12 receptor, beta 601642 NM_00155 12 receptor, beta 601642 NM_00155	interleukin 2 receptor, gamma chain/IL2RG	308380	NM_00020 6	Xq13
4 receptor precursor/IL4R 147781 NM_00041 5 receptor alpha/IL5RA 147851 M96652 6 receptor/IL6R 147880 NM_00056 7 receptor/IL7R 146661 NM_00218 9 receptor/IL9R 300007 6 10 receptor/IL9R 146933 NM_00062 10 receptor beta/IL10RB ****** NM_00062 12 receptor, beta 600939 NM_00553 12 receptor, beta 600939 NM_00553 5 5 12 receptor, beta 601642 NM_00155	interleukin 3 alpha receptor/IL3RA	308385	M74782	Xp22.3
6 receptor alpha/IL5RA 147851 M96652 6 receptor/IL6R 147880 NM_00056 7 receptor/IL7R 146661 NM_00218 9 receptor/IL9R 300007 NM_00218 10 receptor, alpha/IL10RA 146933 R 10 receptor beta/IL10RB ******* NM_0062 12 receptor, beta 600939 NM_00553 12 receptor, beta 600939 NM_00553 5 5 12 receptor, beta 601642 NM_00155	interleukin 4 receptor precursor/IL4R	147781	NM_00041 8	16p12.1- p11.2
6 receptor/IL6R I47880 NM_00056 7 receptor/IL7R 146661 NM_00218 9 receptor/IL9R 300007 NM_00218 10 receptor, alpha/IL10RA 146933 NM_00155 receptor beta/IL10RB ****** NM_0062 12 receptor, beta 600939 NM_00553 12 receptor, beta 600939 S 12 receptor, beta 601642 NM_00155	interleukin 5 receptor alpha/IL5RA	147851	M96652	3p26-p24:
7 receptor/IL7R 146661 NM_00218 9 receptor/IL9R 300007 M_00218 10 receptor, alpha/IL10RA 146933 NM_00155 10 receptor beta/IL10RB ****** NM_0062 12 receptor 11 alpha/IL11RA 600939 NM_00451 12 receptor, beta 600939 5 12 receptor, beta 601642 NM_00155	interleukin 6 receptor/1L6R	147880	NM_00056 5	1921
9 receptor/IL9R 300007 NM_00218 10 receptor, alpha/IL10RA 146933 NM_00155 10 receptor beta/IL10RB ******* NM_0062 receptor 11 alpha/IL11RA 600939 NM_00451 12 receptor, beta 600939 5 12 receptor, beta 601642 NM_00155	interleukin 7 receptor/1L7R	146661	NM_00218 5	5p13
10 receptor, alpha/IL10RA 146933 NM_00155 10 receptor beta/IL10RB ****** NM_0062 1ceptor 11 alpha/IL11RA 600939 NM_00451 12 receptor, beta 600939 NM_00553 12 receptor, beta 601642 NM_00155	interleukin 9 receptor/1L9R	300007	NM_00218 6	Xq28
10 receptor beta/IL10RB ****** NM_00062 receptor 11 alpha/IL11RA 600939 NM_00451 12 receptor, beta 600939 NM_00553 12 receptor, beta 601642 NM_00155	interleukin 10 receptor, alpha/IL10RA	146933	NM_00155 8	11923.3
receptor 11 alpha/IL11RA 600939 NM_00451 2 12 receptor, beta 600939 S 5 12 receptor, beta 601642 NM_00155	interleukin 10 receptor beta/IL10RB	* * * *	NM_00062 8	***
12 receptor, beta 600939 NM_00553 5 12 receptor, beta 601642 NM_00155	interleukin receptor 11 alpha/IL11RA	600033	NM_00451 2	9p13
12 receptor, beta 601642 NM_00155	interleukin 12 receptor, beta 1/1L12RB1	600039	NM_00553 5	9p13
	interleukin 12 receptor, beta 2/IL12RB2	601642	NM_00155 9	1p31.2

Cell-Mediated Inflammatio

				•
	interleukin 13 receptor, alpha 1/IL13RA1	300119	NM_00156 0	Chr.X
	interleukin receptor 13 alpha2/IL13A2	300130	X95302	Xq24
	interleukin 15 receptor, alpha/IL15RA	601070	NM_00218 9	10p15-p14
	interleukin 18 receptor 1/IL18R1	** **	NM_00385 5	**
	CD36/thrombospondin		NM 00007	
	receptor/platelet collagen	173510	2	7q11.2
	CD36 antigen (collagen type I			
	receptor, thrombospondin receptor)-		NM_00550	
	like 1/CD36L1/SRB1	601040	S	Chr. 12
	CD5 antigen-like (scavenger receptor			
	cysteine rich family)/CD5L	602592	602592 NM 005894	1q21-q23
	acetyl LDL receptor/scavenger			
	receptor expressed by endothelial	****	NM_003693	***
	macrophage scavenger receptor			
	1/MSR1	153622	153622 NM 002445	8p22
	macrophage scavenger receptor 1-			
	like/MSRL1	602728	***	8p21
	macrophage scavenger receptor type			
Scavenger	III/SRA	153618	153618 NM 002438	10p13
Receptors	mannose receptor, C type 1/MRC1	****	***** NM 006039	****
4	endocytic receptor (macrophage			
	mannose receptor family) (KIAA0709) ***** NM_006039	*****	VM_006039	***
	toll-like receptor 1/TLR1	601194	601194 NM 003263	4p14
	toll-like receptor 2/TLR2	603028	603028 NM_003264	4q32
	toll-like receptor 3/TLR3	603029	603029 NM 003265	4q35
	toll-like receptor 4/TLR4	603030	603030 NM_003266	9q32-q33
_	toll-like receptor 5/TLR5	603031	603031 NM 006068	1q41-q42

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'additional genes in Inflammation

	collectin 34	***	AB002631	***
	liver collectin 1/CL-L1	****		****
	collectin receptor/complement	120577	* * * *	
	surfactant, pulmonary-associated	110071		
	protein D/SFTPD	178635	178635 NM 003019	10q23.3
	surfactant, pulmonary-associated			1
	protein A1/SFTPA1	178630	178630 NM_005411	.0q22.2-q23.
	myeloperoxidase/MPO	254600	J02694	17q23.1
	eosinophil peroxidase/EPX	131399	NM_00050	** ** **
	PHOX22/cytochrome b-245, alpha polypeptide/CYBA	233690	NM_00010	16q24
Inflammator v Superoxide		306400	NM_00039	Xp21.1
Generation		233700	NM_00026	7q11.23
	PHOX67/neutrophil cytosolic factor 2/NCF2	233710	NM_00043	1925
	PHOX40/neutrophil cytosolic factor 4/NCF4	601488	NM_00063	22q13.1
	B-cell antigen CD54/intercellular adhesion molecule 1/ICAM1/CD54	147840	NM_00020	19p13.3-
	receptor for advanced glycation end products/RAGE/AGER	600214	AJ133822	6p21.3
Adhecion	integrin, alpha 7/ITGA7	600536	NM_00220 6	12q13
TOTOTO	integrin, alpha 8/ITGA8	604063	L36531	****
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	-				
	on in	integrin, alpha 9/ITGA9	603963	L24158	3p21.3
	anti	antigen CD29/integrin, beta- 1/CD29/ITGB1	135630	NM_00221 1	10p11.2
	vas 1/V	vascular cell adhesion molecule 1/VCAM1	192225	NM_00107 8	1p32-p31
	con	complement component 1, R subcomponent/C1R	216950	216950 NM_00173	12p13
	sub	complement component 1, S	120580	NM_00173 4	12p13
	Com	complement component 1, Q			1036 3-
	lod	succomponent, alpha polypeptide/C1QA	120550	** ** ** **	p34.1
·	subc	subcomponent, beta	120570	***	1p36.3-
	сош	complement component 1, Q			
	oqns	subcomponent, gamma	120575	****	1p36.3-
	ylod	polypeptide/C1QG			p34.1
	sapo	complement component 1, Q subcomponent binding protein/C1QBP	601269	NM_00121	17p13.3
	com	complement component 1 inhibitor	106100	M	11q11-
	(aug	(augiocuciila, ileteuitaty) / C.I.IVE		2	q13.1
	com	complement component 2/C2	217000	217000 NM_00006	6p21.3
	com	complement component 3/C3	120700	120700 NM_00006	19p13.3- p13.2
	con	complement component 4B/C4B	120820	NM_00059 2	6p21.3
	com	complement component 5/C5	120900	120900 NM_00173	9q34.1

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complement component 6/C6
complement component 7/C7
complement component 8, alpha polypeptide/C8A
complement component 8, beta polypeptide/C8B
complement component 8, gamma polypeptide/C8G
complement component 9/C9
complement factor H/H factor 1/HF1 134370 NM_00018
I factor (complement)/IF
decay-accelerating factor for complement/DAF/CD55
perforin 1/preforming protein/PRF1 170280
107271
T-cell antigen CD46/membrane cofactor protein/MCP/measels virus
120920
erythrocyte antigen CD55/decay- accelerating factor for
complement/DAF/CD55 125240
leukocyte antigen p18- 20/protectin/CD59

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		-				
			erythrocyte antigen CD35/complement	·		
			receptor CR1 (receptor for	120620	AH002679	1932
			components C3b/C4b)/CD35/CR1			1
			complement component 3a receptor 1/C3AR1	* * * * *	***** NM_00405	* * * * * *
			complement component 4-binding protein, alpha/C4BPA	120830	NM_00071 5	1432
			complement component 4-binding protein, beta/C4BPB	120831	NM_00071 6	1432
			complement component 5 receptor 1 (C5a ligand)/C5AR1	113995	NM_00173 6	Chr.19
			antigen CD21/CD21	***	X98257	****
			B-factor, properdin/BF	138470	NM_00171 0	6p21.3
		Alternative Pathway	properdin P factor, complement/PFC	312060	NM_00262 1	Xp11.4- p11.23
			adipsin/complement factor D precursor/DF	134350	NM_00192 8	****
			phospholipase A2 group	172411	172411 NM_000300	1p35
			phospholipase A2 group IB/PLA2G1B 172410 NM_000928 12q23-q24.	172410	NM_000928	12q23-q24.1
		-	phospholipase A2 group X/PLA2G10	603603	603603 NM_003561 16p13.1-p12	16p13.1-p12
			phospholipase A2 group			
			IVA/PLA2G4A	600522	U08374	1925
	-		phospholipase A2 group VI/PLA2G6	603604	AF064594	22q13.1
			phospholipase A2 group			
			IVC/PLA2G4C	603602	603602 NM_003706	chr. 19
			phospholipase A2 group V/PLA2G5	601192	601192 NM_000929	1p36-p34
		;	phospholipase C, beta 2/PLCB2	604114	604114 NM_004573	15q15
_	_	Phospholipas	Phospholipas phospholipase C, beta 3/PLCB3	600230	U26425	11913

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	es	phospholipase C. heta 4/PI CB4	600810	600810 NAV 000033	20-12
Release of		phospholipase C, delta 1/PLCD1	602142	602142 NM 006225	3
Membrane		phospholipase C, epsilon/PLCE	600597	600597 NM 006226	
Lipids		phospholipase C, gamma 1 (formerly			
(common to		subtype 148)/PLCG1	172420	172420 NM 002660 20912-913.	20q12-q13.
PAF,		phospholipase C, gamma 2			
leukotriene,		(phosphatidylinositol-specific)/PLCG2 600220 NM 002661	600220	NM 002661	16a24.1
and		phospholipase D1, phophatidylcholine-			
prostaglandi		specific/PLD1	602382	602382 NM 002662	3926
n pathways)		phospholipase D2/PLD2	602384	602384 NM_002663	17p13.1
		lysosomal acid lipase/LIPB	278000	278000 NM_000235	10q24-q25
		lipocortin 1/annexin 1/ANXA1	151690	V00546	9q11-q22
		lipocortin 2/annexin 2/ANXA2	151740	D00017	15q21-q22
-	,	lipocortin 3/annexin 3/ANXA3	106490	M20560	4q21
	Annexins	lipocortin 5/annexin 5/ANXA4	131230	NM_00115 4	4q26-q28
		lipocortin 7/annexin 7/ANXA1	186360	NM_00403	10q21.1- q21.2
	Arachidonat	arachidonate 12-lipoxygenase, 12R	603741	NM_00113 9	
	е	arachidonate 15-	152392	NM_00114	17p13.3
	Metabolism	arachidonate 15-lipoxygenase second		NIM OOTTA	
		type/ALOX15B	603697	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	****
		prostaglandin endoperoxide synthetase			
		1/COX1/PTGS1	176805	AH001520	9q32-q33.3
		prostaglandin endoperoxide synthetase			
			600262	600262 NM_000963 1925.2-925.3	1q25.2-q25.3
		thromboxane A synthase 1/TBXAS1	274180	274180 EG_D34613	7q34

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	=					
		Biosynthesis	Biosynthesis prostaglandin D2 synthase			
			(hematopoietic)	602598	****	****
			prostaglandin D2 synthase (21kD,			
			brain)/PTGDS	176803	M61900	****
			prostaglandin 12 synthase/prostacyclin			
			synthase/PTGIS	60109	601699 EG_D83393	20q13
Vaconotivo			prostaglandin E receptor 1, EP1			
Mediators of			subtype/PTGER1	176802	176802 NM 000955	19p13.1
Inflammatio			prostaglandin E receptor 2, EP2			
П	Prostaglandi		subtype/PTGER2	176804	****	5p13.1
1	Su		prostaglandin E receptor 3, EP3			
			subtype/PTGER3	176806	176806 NM 000957	1p31.2
			prostaglandin E receptor 4, EP4			L
	•	Recentors	subtype/PTGER4	601586	601586 NM 000958	5p13.1
			prostaglandin F receptor/PTGFR	600563	L24470	1p31.1
			prostaglandin F2 receptor negative			
			regulator/PTGFRN	601204	U26664	1p13.1-q21.3
			prostaglandin I2		I	T
			receptor/PTGIR/prostacyclin receptor	600022	600022 SEG_HUMIR	19q13.3
			thromboxane A2 receptor/TBXA2R	188070	188070 NM 001060	19p13.3
			solute carrier family 21 (prostaglandin			
-			transporter), member 2/SLC21A2	601460	601460 NM_005630	3q21
			15-hydroxyprostaglandin			
		Catabolism	dehydrogenase/HPGD	889109	601688 NM_000860	4q34-q35
			aldo-keto reductase family 1, member			
_1			C2/AKR1C2	600450	600450 NM_001353	10p15-p14
			arachidonate 5-lipoxygenase/ALOX5	152390	69000 MN	Chr.10
•		-			0	

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		arachidonate 5-lipoxygenase-activating protein/FLAP/ALOX5AP	603700	NM_00162 9	13q12
		leukotriene A4 hydrolase/LTA4H (aminopeptidase)	151570	NM_00089 5	12922
	Synthesis	leukotriene C4 synthase/LTC4S	246530	NM_00089	5q35
Leukotrienes		Gamma-glutamyltranspeptidase 1/GGT1	231950	J04131	22q11.1- q11.2
		Odiniia-giutaniyinanspepudase	137181	AH002728	22q11.1
		Gamma-glutamyltransferase-like activity 1/GGTLA1	137168	NM_00412	**
	Recentors	cysteinyl leukotriene receptor 1/CYSLT1	300201	NM_00663 9	Xq13-q21
	STORMAN	leukotriene b4 receptor (chemokine receptor-like 1)/LTB4R	601531	NM_00075	14q11.2- q12
	Catabolism	renal microsomal dipeptidase/DPEP1	179780	NM_00441 3	16q24.3
	Biosynthesis	CDP-choline:alkylacetylglycerol cholinephosphotransferase	* * * *	***	****
	Receptors	platelet activating factor receptor/PTAFR	173393	M88177	1p35-p34.3
Platelet		platelet activating factor acetylhydrolase 1/PAFAH1	069109	NM_00508 4	6p21.2-p12
Activating Factor (PAF)		practice and value factors acetylhydrolase, isoform 1B, alpha	601545	NM_00043 0	17p13.3
	Catabolism	practice activating factors acetylhydrolase, isoform 1B, beta	602508	NM_00257 2	11923
		acetylhydrolase, isoform 1B, gamma	603074	NM_00257 3	19q13.1

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	do.		platelet activating factor	602344	NM_00043	* * * *
			accifuity diolase 2/1 Ar Aliz		,	_
			superoxide dismutase 1/SOD1	147450	147450 NM 000454	21q22.1
			superoxide dismutase 2, mitochondrial 147460	147460	X65965	6q25.3
			glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), catalytic (72.8kD)/GLCLC		230450 NM_00149	6p12
			glutathione synthetase/GSS	601002	NM_00017 8	20q11.2
			catalase/CAT	115500	115500 NM_001752	11p13
	Antioxidants	Antioxidants	Antioxidants Antioxidants glutathione peroxidase 1/GPX1	138320	AF029317	3p21.3
	and Free Radical	and Free Radical	glutathione peroxidase 2 (gastrointestinal)/GPX2	138319	NM_00208 3	14024.1:
	Scavengers	Scavengers	_		NM_00208	•
Amelioration			(plasma)/GPX3	138321	4	5q32-q33.1
of Oxidative			glutathione peroxidase 4		NM 00208	
Stress			(phospholipid hydroperoxidase)/GPX4 138322	138322	S	19p13.3
	•••		glutathione peroxidase 5 (epididymal		NM_00150	
			androgen-related protein)/GPX5	603435	6	****
			ATX1 (antioxidant protein 1, yeast)		NM_00404	
			homolog 1/ATOX1	602270	S	5932-933
			apolipoprotein (a), Lp(a)/LPA	152200	152200 NM 005577	6q27
			paraoxonase 1/PON1 (arylesterase)	168820	NM_00044 6	7q21.3
	Prevention of Lipid	Prevention of Lipid	paraoxonase 2/PON2	602447	NM_00030 5	7q21.3
	Oxidation	Oxidation	paraoxonase 3/PON3	602720	L48516	7921.4
			apolipoprotein, Lp(a)/LPA	152200	NM_00557 7	6q27

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		Te	Table 7. Neu	rological ar	nd Psychiatr	Neurological and Psychiatric Disease Indications	dications	F	
	Pathway	Amyotrophi c Lateral Sclerosis	Multiple Sclerosis	Dementia	Parkinson' s Disease	Dementia Parkinson' Huntington' s Disease	Epileps y	Spasticit y	
	storage								
	release								
	glutamate	のできる。	がはない。	50 Jan	Section 1	The second second	Water Company		
	serotonin				10000000000000000000000000000000000000	STATE OF THE STATE		The state of the s	
	dopamine			語が書	100 m	ではない。	N. S. S.		
	epinephrine and			がから	THE REAL PROPERTY.			新教院	
Neuro-	norepinephrine								
ransmitters	_					THE PERSON NAMED IN	24.53		
	histamine					Total Carlo	A CANADA SANA	T. A. C.	
	adenosine						はいいのの		
	GABA				1年4年4月		が発売が	は世界がある	
	glycine						1000	1	
	taurine							The same	
	melatonin						-10 K 20 C 40 K		
	nitric oxide			が という	A CONTRACTOR				
	peptide hormone			-	北京大学			Ī	
	processing					•			
	opioids	APPLICATION	THE REAL PROPERTY.	企业		所名を改造	ŀ		
	oxytocin					S. S. S. San Marketing	11.500		
	cholecystokinin						57 Sept. 10		
	neuropeptide Y								
	leptin								
	neurotensin								
	tachykinin								
	bradykinin								
				•		-			

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	angiotensin			u iid Hafi					
	vasopressin								
	vasoactive intestinal peptide								
	calcitonin and CGRP								
Peptide	corticotropin releasing hormone			S					
поптолея	thyrotrophin releasing								
	in Figure			200 Sept. 100 Se		-			
	thyroid stimulating hormone								
	gonadotropin releasing					.			
	hormone romere summating					·			
	somatostatin			No. of the					
	growth hormone								
	adrenocorticotropic			ながらなった。					
	hormone								
	prolactin								
	galanin				ę				
	bombesin								
	glucagon								
	camosine								
	calcium channel			18. TAN					
Channels	potassium channel		40000		ののでは、		芸芸芸芸	TO THE PERSON OF	
	sodium channel				ない。				
	prostaglandin			おいる。	は、日本の				
Inflammation	Inflammation platelet activating factor		指揮	1 3					
	cytokines		新型	W. 1. 1872					
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	00																	ions	Neuralg ia and Pain				
emite, a je mej gele.		的情報的	*				STATE OF THE PARTY	<u></u>			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	では、				-		Table 7. Neurological and Psychiatric Disease Indications	Ischemic Cerebro- vascular Disease			······································	
Lagarita de la composição br>La composição de la composição							なる。大学				day of the last	WARRIED						ychiatric Dis	Migraine				
	000	* 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			では					(1) (2) (2)				· · · · · · · · · · · · · · · · · · ·		ical and Psy	Schizo- plirenia			. <u>v</u>	2
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	Ò			DESCRIPTION OF THE PERSON OF T	The state of the s	が表現												Table 7	Anxiety				
	S	estrogen	testosterone and DHT		hemostasis	oxygen stress	mitocitonura	protein maturation and degradation	second messenger cascade	growth, differentiation, and apoptosis	cytoskeleton	secretion	adhesion	amyloid processing	lipid transport and	medination	folate metabolism		Pathway	storage	release		
·	RIAGENICS	Steroid	ν.	Cordious	oar circy assemi				100	Growth,	Differentiation	ce											

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	glutamate				記録が	《新聞》	
	serotonin			法			がない。
	dopamine	新作业		を	NAME OF TAXABLE PARTY.	A Principal and Parish	1116-
	epinephrine and			がいる。	THE PROPERTY.		る。
enro-	norepinephrine			41			
smitters	acetylcholine		海道源	語の意味		がはいる。	
,	histamine			である。 では、 では、 では、 では、 では、 では、 では、 では、		7 3 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	A. S. S. S.
	adenosine		でできる。				
	GABA		4 A 4 6	新公司	ののである。		***
	glycine						T. DELY-CYCLE
	taurine	SE S				The state of the s	
	melatonin		100				の大きいでする
	nitric oxide				美加州地区	を行るという。	
	peptide hormone processing						
	opioids	西 水水 电影					15500
	oxytocin	183			は明確は日本に		
	cholecystokinin		1				の意味を表する
	neuropeptide Y						AND THE PERSON
	leptin						
	neurotensin			X 100			
	tachykinin			(V	本题的证据		No.
- 	bradykinin					法別変	
	angiotensin						OF COMPANY
	vasopressin	はない。					
	vasoactive intestinal						
	peptide						
	calcitonin and CGRP		N. A. S. S.		北北京		
ptide	corticotropin releasing					10,400,000	The state of the s
monee	погтопе		THE PERSON NAMED IN				

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1101110110	thyrotrophin releasing hormone							
	thyroid stimulating							
	hormone							
	gonadotropin releasing							
	hormone			-				
	Totalere standaring							
	somatostatin			-			できるが	
	growth hormone						4.40	
	adrenocorticotropic	·				-		
	hormone			isa sa				
	prolactin							
	galanin						4.00	
	bombesin						Service Co.	
	glucagon							
	carnosine							
	calcium channel		第二次	A CONTRACTOR OF THE PARTY OF TH	相對為如	100 00 100 100	社ではない	
Channels	potassium channel		Trans.		* A STATE OF THE S	3.00	Art Car	
1	sodium channel					泛及	を表する	
	prostaglandin				THE PARTY OF		10 m	
Inflammation	Inflammation platelet activating factor				Part of the last o	THE PARTY OF THE P	A CONTROLL OF THE PERSON OF TH	
	cytokines					を記録が	を変え	
Steroid	estrogen	A STATE OF THE STA				は非常が存		
Homones	testosterone and DHT					Ì		
comounce	corticosteroid							
Cardiovascul	clot formation					通常是现在的		
ar	hemostasis	ない。これ			の一大ない。	ののないでは、		
	oxygen stress		NAME OF STREET			新教教		
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S	protein maturation and degradation	second messenger cascade	growth, differentiation,	Differentiation and apoptosis	cytoskeleton	secretion	adhesion	amyloid processing	lipid transport and	metabolism	myelination	folate metabolism
NAGENICS		. Jular	Growth.	Differentiation	n and	ď						

				Table 8. To	Table 8. Toxicological Indication	Indication	
					Satety		
	Pathway	Efficacy	Dyscrasia	Cutaneou s Toxicity	Cutaneou Systemic S Toxicity	CNS	Hepatic
ion	Gastrointestinal Drug Metabolism				(man)	TOTALLY	TOVICILY
Dietrihution	Drug Binding						
Homomer	Drug Transport	医		A. 100 Sept.		- C. W. C.	· · · · · · · · · · · · · · · · · · ·
Phase I Deng	Monooxigenases (mixed		1.50	大変を表			
Metabolism	Metabolism function oxidases)						
Coxidation	General Oxidases						
oud ond	Dehydrogenases			2000			* P. T.
reduction	Fatty Acid b-Oxidation	建筑和	語が記憶				
,	Reduction	神秘外	Company of	Assessed to	第二次		

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Phase II Drug Metabolism	Catabolism	Uptake and	Renal Tubular Uptake and Concentration	Protection from Radical Damage	Mast Cell and T-Cell Response	B-Cell Response	Myeloid Differentiation
Phase II Drug Metabolism	(conjugation and catabolism)	Fxcretion		Organ and Tissue Damage		Response	

		Table 8. Toxicological Indication	vicological	Indication	
			Safety		
	Pathway	ular	Pulmonar Renal y Toxicity	Renal Toxicity	
Absorption	Gastrointestinal Drug Metabolism			.:	
Distribution	Drug Binding				
	Drug Transport		が変数	1000000	٠.
Phase I Daig	Monooxigenases (mixed			-	
Metabolism	Marsholism function oxidases)			A11	:
Coridation	General Oxidases		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
, , , , ,	Dehydrogenases		The state of the s		: .

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Fatty Acid b-Oxidation

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Reduction

Phase II Drug .. _ Conjugation

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	Indication		Inflammato L	ry Bowel	Disease	
	Table 9. Inflammatory Indication		, V	Unillinia . C	e Disease	
	able 9. Inf	Chronic	Obstructi	ve	Pulmonar	v Dispase
-	T			Arthritis Asthma		
				Arthritis		
				Pathway		

Protection from Radical

Organ and

Damage

Damage Tissue

Mast Cell and T-Cell

Renal Tubular Uptake

Excretion

Uptake and

Catabolism

catabolism)

and Concentration

Myeloid Differentiation

B-Cell Response

Response

Immune Response

Discriminatio Antigen Presentation and

Recognition

(Self vs Non-

Inflammation

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TNF Ligand Superfamily, Chemokine Superfamily, and other	Cyclophilins Corticosteroids	Testosterone/DHT Vitamin D	Retinoic Acid	Myeloid Progenitor Cell Activation, Differentiation, and Proliferation (excluding genes from	Apoptosis (additional genes in Oncology) Adhesion and Migration	Glycosyltransferases Proteases and Protease Inhibitors	Immunoglobulin Heavy and Light Chains and Genes Involved in Rearrangement, Isotype Switching, and Transcription
Cytokine- Mediated Immune Regulation			Regulation	le C	tion		Defense Proteins and Peptides

Complement						-
Acute Protection from Pathogens						
Pregrammanon or Platelets, Mast Cells, Neutrophils, and					.20	
Release of Membrane Lipids						
(common to PAF, leukotriene, and						
prostaglandin pathways)					****	
Prostaglandins				The second		
Platelet Activating Factor (PAF)	. .					
Leukotrienes						
Histamine		はは				
Nitric Oxide Pathway		""				
Endothelial Growth						
Epinephrine and Norepinephrine Pathway						
Dopamine Pathway	bristop (break) and de	200 M 200 M 100 M				
Acetylcholine Pathway		にはなる	A BENEFIT OF THE PERSON NAMED IN		0.000	
Ion Channels			NAME OF THE PARTY	STATE OF THE STATE		
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0													The second second second	Table 9 Inflammatory Indication		Nephritis								-
cs	Leptin	Cholecystokinin (CCK)	Tachykinin, Substance P, or Neurokinin Pathway	Bradykinin	Parathyroid Hormone (PTH)	Melanocortin and	Adrenocorticotropic Hormone	Folate Metabolism	Nucleotide Metabolism	Cytoskeleton	Oxygen Stress	(additional genes in Toxicology)	(1900000			Pathway	4	Antigen Presentation and Recognition	10111112	miereous, miereukins,	INF Ligand	Superfamily, Chemokine Superfamily, and other	Count Forter	Cyclophilins
VARIAGENIC	Pentide	Hormone	Inflammetory	Modulation						General Cell	Growth						.0	ជ		Cytokine-	Mediated	Immune	Regulation	Non-
VAR																							_	

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Corticosteroids	Testosterone/DHT	Vitamin D	Retinoic Acid	Myeloid Progenitor Cell	Differentiation, and	Proliferation	(excluding genes from	Apoptosis	(additional genes in	Oncology)	Adhesion and Migration	Glycosyltransferases	Proteases and Protease	Inhibitors	r nagocytosis or	Immunoglobulin Heavy	and Light Chains and	Genes Involved in	Rearrangement, Isotype	Switching, and	Transcription	Complement	Acute Protection from	Pathogens
Cytokine	Mediated	Immune	Regulation				1,0	Vediated	Inflammation	mination in the contract of th									Defense	Proteins and	Peptides			1

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Pogrammation of Platelets, Mast Cells, Neutrophils, and	Rele Lipic (com leuka prosi		Lipoxins Leukotrienes Histamine	Serotonin Nitric Oxide Pathway	Endothelial Growth	Epinephrine and Norepinephrine Pathway Dopamine Pathway Adenosine Pathway		Leptin Cholecystokinin (CCK)
	Small Molecule	Inflammation			Vascularizati on		Neurotransmi tter and	Peptide Hormone

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Inflammetory or Neurokinin Pathway	Bradykinin	Parathyroid Hormone	(PTH)	Melanocortin and	Adrenocorticotropic	Hormone	Folate Metabolism	Nucleotide Metabolism	General Cell Cytoskeleton	Oxygen Stress	(additional genes in	Towing
Inflammetory	Modulation								General Cell	Growth		

			Table 10.	Metabolic	or Endocrin	Table 10. Metabolic or Endocrinologic Indication	ation	
	Pathway	Diabetes Mellitus	Diabetes Insipidus	Obesity	Contra- ception	Hormonal Insufficienc Osteo- y Related porosis	Osteo- porosis	Acne
General Metabolism Peptide Ho for Peptide Processing Hormones	General Metabolism Peptide Hormone for Peptide Processing Hormones							
	Circadian Regulation Adrenocorticotropic				THE LANGE OF ALL	教訓: 須飯		
Control of Metabolism	Thyroid Hormone Gonadotropic Hormones				是阿尔特斯	新松、利加		

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	Progestins								
	Estrogens			٠.					
Steroid	Androgens								
Homones	Glucocorticoids					Bar Sa		新	
TOTTIONES	Mineralocorticoids				新加州				
	Mediators of Steroid	E T			E 2 1 10 10	数学			
	Response			通過では	が一般に対象				
Neural	Serotonin								
egulation of	Dopamine								
Appetite	Norepinephrine			THE PERSON NAMED IN					
	Neuropeptide Y	が記録が		200 M					
	Galanin	が記録							
	Melanocortin								
	Opioids			がある。		AND THE STATE OF T			
Peptide	Cholecystokinin					200			
Hormonal	Adrenocorticotropic								
egulation of	Hormone								
Appetite	PACAP								
	Enterostatin	建筑和		31 March 1997					
	Insulin					では、日本の			
	Leptin					:	Sarah Maria		
	Thyroid Hormone								
Control of	Glucagon			教が経済					
Metabolism	Glucagon-Like Peptide								
	Insulin			10.00 May 11.00			A STATE OF		
Thermo- regulation	Uncoupling Proteins								
	Somatostatin								
	Growth Hormone			光線影響			THE REAL PROPERTY.		

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Insulin-Like Growth Factor	Fibroblast Growth Factor	Sonic Hedgehog	Nerve Growth Factor	Neurotrophins	Hormone Signalling	Metabolism	Maturation and	Protein Glycosylation	Neovascularization	Hemostasis	Amelioration of	Oxidative Stress	Retinoids	Differentiatio Peroxisome Proliferation	Lipid Metabolism and	Storage	Calcium Metabolism	Bone Growth Factors and Receptors	Vitamin D	Phosphate Metabolism	Cytokines	Adhesion
General	Growth	Control				Carbohydrate Metabolism		1112		(II)poxia,	Ε	_	Adipocyte	Differentiatio	Lipid Metabolism		Calcium	.0		Phosphate Homeostasis	Inflammation Cytokines	(more genes Adhesion

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Table 10. Metabolic or Endocrinologic

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Pathway	Alopecia	Adrenal Dys- function	Thyroid Dys- function	Parathyroi d Dysfunctio n
Peptide Hormone Processing				
Circadian Regulation				
Adrenocorticotropic				
Hormone				
Thyroid Hormone				1000
Gonadotropic Hormones	les at the second			
Progestins				
Estrogens				
Androgens				
Glucocorticoids				
Mineralocorticoids				
Mediators of Steroid			100	
Response			経験を含	
Serotonin				
Dopamine				
Norepinephrine				
Neuropeptide Y				
Galanin				
Melanocortin				
Opioids				
Cholecystokinin				

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